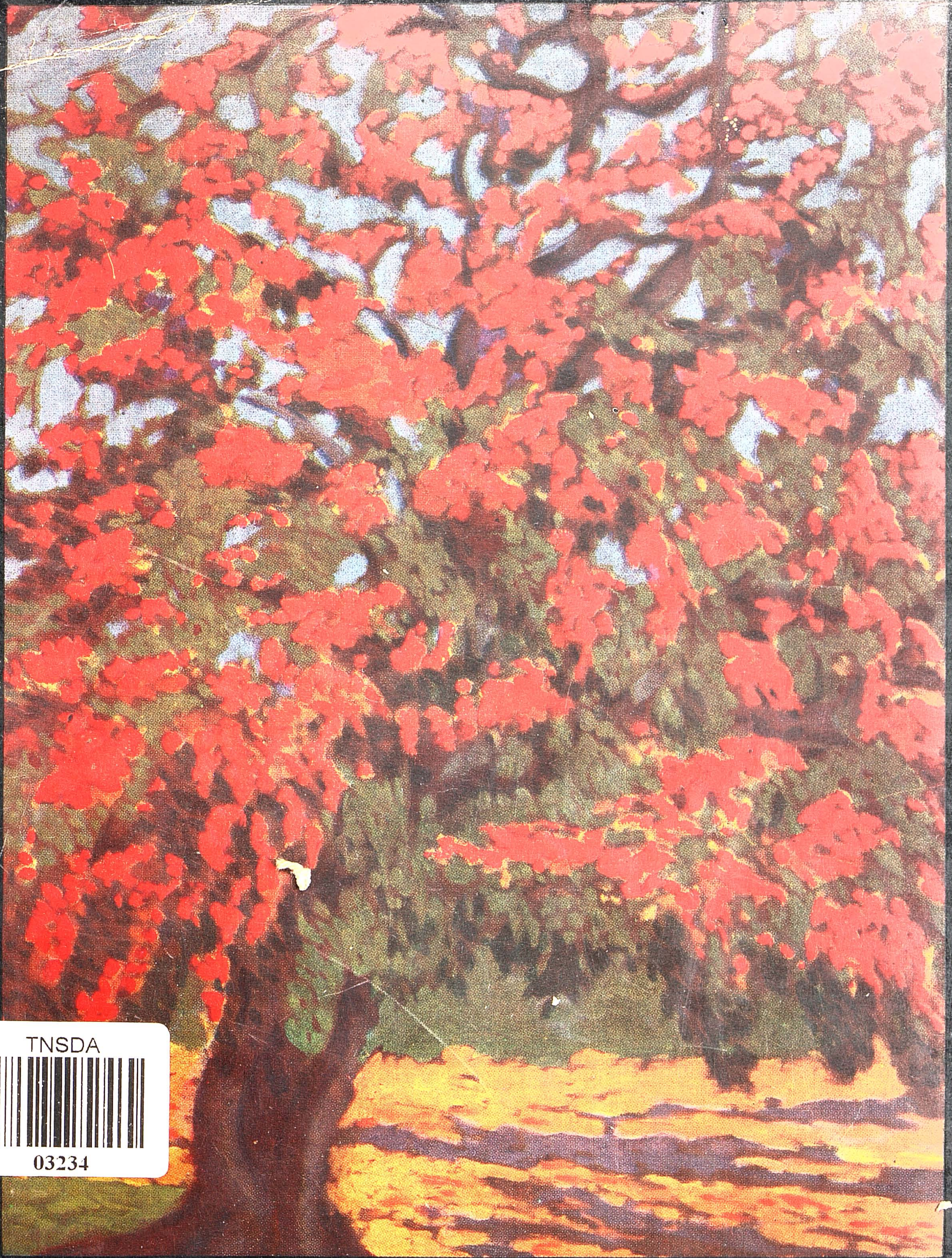

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BEAUTIFUL GARDENS

M. S. RANDHAWA

Beautiful Gardens is evocative of the poetry of the verdant nature. Written by a scientist-administrator and a naturalist, it is the result of his lifetime interest in trees, gardens, forests and the countryside of India.

Though in a sense an intensively subjective book, it is nonetheless of great value to the arborist and the town planner. After an exhaustive treatment of various types of ornamental gardens, Dr Randhawa outlines a scheme of bio-aesthetic planning and shows how it can fit in with nature conservation. There are useful descriptions and hints on the gardening of important ornamental flowering, foliage and shade trees, and fragrant shrubs. Trees which deserve to be more popular and odd and unusual trees have also been described. A book of great interest to lovers of trees and tree-lore and those interested in garden aesthetics and land-scaping.

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BEAUTIFUL GARDENS

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M. S. RANDHAWA
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LUDHIANA

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PREFACE

THIS is a saga of the Tree Beautiful. It is the result of a decade of observation and worship of the beautiful trees of India. It recalls many joyful hours spent in the forest, the countryside and the garden feasting my eyes on the beauty of mauve bauhinias and flaming scarlet blossoms of *palas*. In my quest for the Beautiful Tree, I wandered all over the face of India—from the Himalayas to Kanyakumari. I was thrilled by the beauty of the graceful coconut palms with their plume-like leaves swaying gracefully in the scented breeze of Kerala, the land of the coconut palm. I enjoyed the beauty of plumerias, their waxen leaves and white branches glistening in the tropical sun of the countryside of Travancore. The graceful bamboo forests at the foot of the Nilgiris, the blue mountains of South India, appeared indescribably beautiful in the early monsoons. The teak forests of Central India kept me company for days, and I enjoyed the rustling of their broad leaves and the sight of their pale yellow blossoms. In the submontane Bihar, I enjoyed the sight of *sal* trees, and the dark village women clinging to the flower-laden branches of *sal* reminded me of the mother of the Buddha. The Himalayas in spring time, when the plum and the wild pear burst into a white universe of flowers, made a deep impression on me.

The flowering of the forest trees is the spontaneous expression of the mystery of life. Contemplating the beauty of the trees, one experiences the joy of the Impersonal, when the inner self of man and the outer self to Nature unite. In the union of the soul and Nature one experiences ecstatic joy and forgets one's little self. Thrilled by the beauty of the blossoms of the forest trees, the sailing clouds, the golden sunsets and the splendour of the snow peaks, one feels elevated and a rain of beauty seems to drizzle.

In these pages a sensitive reader will enjoy the beauty of the gardens, the forests and the countryside of India. As one thinks of the forest, images of great strength and beauty flash before one's eyes. And these images are more clear if one has had a chance to visit a forest in one's younger days when the mind is more receptive and impressions are more vivid. Forest trees provide an appropriate background to our emotions, for they remind us of our primaeval ancestors who often read their own moods in Nature. The forest-lore of India provides a vast fund of primitive imagination and feeling which may well be ranked with real poetry. As I delved into the tree-lore of ancient India, I reconstructed forest scenes among which lived our *rishis* and forest maids in association with the trees which they loved and looked after. The ancient garden-lore gave me great happiness.

The dwellers in the forest who are more familiar with trees in their surroundings

have spun numerous yarns about trees and tree gods and goddesses. In folk-songs of the forest tribes, one finds numerous references to trees. In these folk-songs and folk-tales one enjoys great panoramas of poetic delicacy and flashes of colour effects.

Now that tree planting has been adopted as a national policy and emphasis has been given to the planting of the denuded forests, strips of land along the canals and rivers, roadside avenues and village plantations, it is necessary that love and reverence for trees is evoked among the people.

This book sums up a lifetime interest in trees, gardens, forests and the countryside of India. An attempt has been made to understand the character and personality of the beautiful trees of India, and to convey to others the joy I have experienced in watching the pageant of colour which marches through the countryside of this northern part of the Subcontinent through the twelve months.

The Indian Council of Agricultural Research have been taking special interest in promoting landscape gardening and ornamental horticulture in the country. Landscape gardening has been introduced as one of the subjects in the B.Sc. (Agriculture) in Agricultural Colleges of the various States. At the Third Session of the Indian Council of Agricultural Education held at Bangalore in August, 1958, it was decided that a book on landscape gardening be produced for the benefit of students. The present book is expected to fulfil that purpose.

It is hoped that Beautiful Gardens will be useful to all those who are interested in trees and tree-lore, garden aesthetics and landscaping.

Garden House
Garden Colony, Kharar, Punjab
May 1, 1969

M. S. Randhawa

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Chapter I

QUEST OF THE BEAUTIFUL TREES

"BUTEA FRONDOSA is one of the most showy flowering trees and is also called the Flame of the Forest. The petals yield a yellow dye commonly used in the Holi festival." From an otherwise prosaic textbook of botany this was the spark which, when I was sixteen, fired my imagination and kindled in me the love for beautiful flowering trees. Having been brought up in the rather drab countryside of the Punjab where the only common trees are the *shisham*, *kikar* and *phulahi*, like most up-countrymen I was not aware of the wealth of colour in the vegetation of the sunny East and South. My posting to Faizabad in Uttar Pradesh introduced me to the glamorous yellow *amaltas* and the orange blossoms of *gulmohur*. At Lucknow, I made my first acquaintance with the sober blue tints of the jacaranda and the purple and mauve shades of *Lagerstroemia thorelii*. In this city of parks and pleasances, I saw for the first time the pink cassia tree robed in delicate pink. I was enchanted by its beauty. It was like falling in love at first sight and the pink cassia, which appeared like a gigantic bouquet of roses, has remained my favourite tree.

When out on tour, I used to wander in the *dhak* forests which were a blaze of fire in the month of March and provided the most picturesque background to the fields of golden wheat. The Flame of the Forest, with its naked branches turned into flaming torches, was a never-to-be-forgotten sight. Wandering in the forest every morning and evening, I spent hours admiring the beauty of its flowers which lent glamour to patches of salt-infested land on which nothing else would grow. White egrets roosting on some of the taller trees or following droves of buffaloes added an attractive note to the scene. The oppressive stillness of the forest was intermittently relieved by the organ-like notes of the *sarus* (cranes) who raised their graceful necks, turned their scarlet heads, suspiciously watched the intruders into their sanctuary with their beady eyes, flapped their slate-coloured wings and glided off. In the quiet of Rae Bareli, which was more or less an overgrown village, I had the opportunity of making a closer and more intimate acquaintance with many flowering trees planted by tree-loving Englishmen in the compounds of bungalows, relics of the early post-Mutiny Anglo-Indian period, now looking decrepit and forlorn. I watched the pink, mauve and white varieties of *kachnar* laden with orchid-like flowers which brightened up the compounds of many houses. I also saw the white *champaka*, *Plumeria alba*, prodigally scenting the air with its fragrance in obscure corners of the grounds of many bungalows. Scattered in the Civil Lines were many *frangipanis*, conspicuous on account of their gaunt limbs which in the month of April were clothed in clusters of giant leaves and capped with the most delicately scented pale

yellow flowers. In a corner of a Deputy Collector's house was a *Kleinhovia*, its branches crowned with delicate pink flowers and covered with heart-shaped leaves. At the entrance of my house was a clump of Easter trees which in the month of April appeared most attractive, their fragrant white flowers contrasting with their dark branches. Captivated by their beauty, I felt annoyed with the person who gave them the horrid name of *Holarrhena antidysenterica.*

The indifference of my countrymen to the beauty of flowering trees was no small cause of annoyance to me. Why were they oblivious of the beauty of our *dhak*, *kachnar* and *semal* trees ? While there are plenty of people who would plant trees for fruit or timber, there are very few who would bother to plant an ornamental flowering tree. So I realized that while the fruit trees could take care of themselves, emphasis must be laid on the planting of beautiful flowering trees in places where they should be planted. While ornamental trees have no place on our national or State highways and canal plantations, they must be given their due place in our homes, public parks, public buildings and town roads. On account of the prevailing lack of aesthetic taste among our countrymen, this crusade for the beautiful tree was necessary, even at the risk of over-emphasis. Our ancestors of the Asoka and Gupta periods were people of the highest aesthetic perception, while we are surprisingly deficient in aesthetic consciousness. I thought the planting of beautiful trees in homes and public places in towns would provide a healthy corrective and would lead to a genuine improvement in taste, particularly among the educated classes who profess to be cultured. I decided that the beauty of these trees must be multiplied for the benefit of those who had shut their eyes and persistently refused to see it. It should be conspicuously brought to their notice by planting these colourful trees on platforms of railway stations and in the form of avenues along streets and roads in their towns, and brought to their very doors by encouraging the planting of such trees in their gardens. I made arrangements for planting these beautiful trees in the compounds of district courts, *tehsils*, schools as well as in the houses of the well-to-do along the road-sides. Though I never saw these trees grow up, I knew that some day they would flower and convey my message of love for the beauty of nature at least to the coming generation.

My purchase of a residential site in Allahabad brought me in touch with the problem of beautiful trees in association with buildings. The type of trees that should be grown to provide a feast of colour from month to month brought me face to face with a host of problems which I tried to solve. I felt there must be scores of people who were anxious to build homes and who would like to know what trees they should plant to beautify their residences. While thrashing out this problem, I came in contact with M. D. Chaturvedi, at that time a Conservator of Forests in Uttar Pradesh. Chaturvedi was an original thinker whose contribution to bioaesthetics is significant. It was with his collaboration that I started the pleasurable pursuit of

celebrating tree-planting weeks in Uttar Pradesh, which under the inspiring lead of K. M. Munshi became a national festival and is now celebrated with so much enthusiasm in all parts of the country.

After familiarizing myself with the beautiful trees of the present, I adventured into the past. V. S. Agarwal, Curator of the Lucknow Museum, introduced the graceful Kushan sculptures to me. These sculptures unlocked the secrets of ancient Buddhist temple gardens to me and also provided a clue to the climate of that period. The Kushan Yakshinis sporting with flowers of *asoka*, *kadamba* and *champaka* revealed the love for beautiful trees which our ancestors had, and also gave an indication of the climate of Vrindaban, the land of Krishna and the gopis, about 2,000 years ago, and how desiccation had affected the country in which the *asoka* and *kadamba* forests once flourished.

'The Woman and Tree' motif in the Bharhut and Mathura sculptures with its surprisingly accurate delineation of the *asoka* and *kadamba* stimulated my curiosity to see these trees in flower. The true *asoka* tree—*Saraca indica*—is very rare in North India and is usually confused with another tree *Polyalthia longifolia*, also called *asoka* which has a mast-like crown and pale green flowers, and is commonly grown in gardens and compounds of houses in Uttar Pradesh. The real *asoka* tree, the red-flowered *asoka* of Kalidasa and the Kushan sculptors, is known to very few people indeed. There is a solitary specimen in the Ram Bagh, Amritsar, and a few trees can be seen in the city of Lucknow. When the *asoka* tree is not flowering it resembles the litchi tree, and the similarity in the shape of their leaves is so great that a superficial observer can easily confuse one with the other. However, when the *asoka* is flowering, there is no scope for any confusion, for it is hard to find another tree with such beautiful flowers. When I saw a clump of *asoka* trees laden with bunches of crimson-red flowers in a house in Lucknow, I greatly enjoyed the thrill of discovery. The coral-red bunches of flowers bursting out of the branches of the *asoka* and peeping through the dark green mango-like leaves gave me great happiness. I then realized why the ancient Hindus adored this tree which was an ornament of their temple gardens and provided romantic themes to their poets and sculptors.

The *kadamba* tree proved elusive and it was after a great deal of search that I located a beautiful specimen in the compound of the house of a *talukdar* in Rae Bareli district. It was a graceful *kadamba* with its spreading crown bearing a rich crop of ball-like flowers amongst a garniture of shiny broad leaves. The *kadamba* flowers resemble *laddus*, a sweet associated with Krishna. There were vast forests of *kadamba* trees in the region of Vrindaban about which we read in the Maha Bhagavata, and now only a few specimens can be seen between Mathura and Bharatpur—remnants of a luxuriant forest which covered this area about 2,000 years ago.

The *pipal* is the 'Bodhi Tree', the tree of enlightenment under whose cool shade Gautama became the Buddha. The Bharhut sculptures date from the time of Asoka

and we find that the person of the Buddha was not yet worshipped by the Buddhists. As E. B. Havell observes, "Everything is Buddhist, but it is Buddhism without the Buddha. He nowhere appears either as a heavenly person to be worshipped or even as an ascetic. The objects which attract the reverent homage of both men and beasts are the symbols of the faith: the sacred footprints, the Bodhi Tree in which the Presence dwelt, but not the Presence itself." In these sculptures, we find groups of devotees worshipping the *pipal* tree, which is garlanded by *apsaras*. Surrounding the *pipal* are branches of the mango, bearing large clusters of fruits, and the inevitable corymbs of the *asoka* tree with tassels of leaves below. The halo of sanctity which the *pipal* acquired so early in the history of India continues even in this modern age, and the sanctity of the trees was a prolific cause of riots prior to August, 1947.

"Why did the Hindus regard the *pipal* tree as so sacred ?" I often wondered. A *pipal* tree beside the village pond is the village club where the villagers assemble for an afternoon chat. Under its hospitable shade the wayfarer seeks refuge from the heat of the sun in summer, the elders gather for gossip and the boys watch the buffaloes enjoying their afternoon bath. It was in the month of April that I stayed in a bungalow in Bharwain in the Siwaliks of Hoshiarpur. The full moon of the *Purnamashi* had spread a mantle of silver over the Suan Valley. Against one corner of the bungalow was a tree with leaves shining like golden lamps. These were the young coppery leaves of the *pipal* which were transformed by the moonlight into myriads of fairy lamps. In the morning, the blazing sun of April came out from behind the *pipal* tree, turning their copper into molten gold. Thus I realized that the ancient Hindu poet was not exaggerating when he said that in the roots of the *pipal* is Brahma and in its stem Vishnu, and on its top sits god Shiva.

The beauty of the sculptures from Bharhut, Sanchi and Mathura stimulated my interest in the ancient Hindu and Buddhist gardens, and thus I became acquainted with the works of Kalidasa and Ashvaghosha and Vatsyayana's *Kamasutra*. The number of trees with which Kalidasa was familiar amazed me. Kalidasa must have been an ardent lover of nature watching trees in all their moods. He must have roamed the forests along the banks of the Narbada in Central India to the birthplace of the Ganges in the Himalayas where he must have seen the forests of pine and deodar. The study of the Hindu classics with particular reference to the beautiful flowering trees and of ancient tree-lore enabled me to reconstruct forest scenes among which lived our *rishis* and forest maids in close association with the trees they loved and looked after. When I contrast Kalidasa's knowledge with the ignorance of our present generation to whom every tree is a tree, every bird a *chirya* and every herb a *bootee*, I sometimes wonder whether we do not in some ways at least show retrogression. I remember a classmate of mine, a townee from Lahore, who could hardly distinguish a *pipal* tree from a *beri* though he was a graduate in Botany. He reminded me of another like him who was called up for an interview

RHODODENDRON ARBOREUM IN BLOOM IN THE HIMALAYAS

for a job and when questioned whether he had ever seen a wheat plant, could not tell whether wheat grew on a herb, a shrub or a tree, and was not surprised when told that the beams of the roof under which they were sitting were made of wheat trees.

The artistic impulse which gave India the beautiful sculptures of Bharhut, Sanchi and Mathura, the mural paintings of Ajanta, the temple gardens of Nalanda and Taxila and the literature of Ashvaghosha and Kalidasa spent itself by the end of the seventh century A.D., and after that we hear no more about the *asoka* trees and their lovely maidens. Nor do we see that inspiring art which has won the admiration of lovers of beauty the world over.

The quest of the beautiful tree ultimately became the quest of the beautiful in life—the Life Beautiful. I began to study the interiors of homes of people, the houses of cultured Englishmen as well as of Indians of all classes. The sober taste of the cultured Englishman, his selection of furniture and objects for interior decoration and their orderly arrangement were worth emulating. On the other hand, the lack of taste and absence of aesthetic values in an average middle class Indian home nauseated me. Then I was in the quest of the Home Beautiful. Was there a home in India which combined the aesthetic principles of decoration with indigenous materials ? On a visit to Shantiniketan, I found such a synthesis in the home of Rabindranath Tagore, so tastefully decorated by his son Rathindranath who is himself a keen gardener and an aesthete. His small garden-house opening on to a beautiful garden where I could see almost every colourful tree of India, appealed to me greatly. Here was a place where one could contemplate beauty in an atmosphere of peace, the beauty of trees and the beauty of landscape, the beauty of the monsoon showers and the beauty of humanity arising from the serenity of mind, the hallmark of true culture, which comes from the contact of the human mind with nature.

I also found beauty in the mud houses of some of the villagers with their carefully plastered walls decorated with abstract figures of men, women and animals which have provided inspiration to some of our modern artists who have wandered in villages in search of folk art. I found real beauty in the mud houses of farmers in the Kangra Valley. Here were clusters of houses which seemed to grow from the earth and, like the *kainth* trees of the valley, are the true children of Mother Earth.

Ultimately, the pleasing discovery dawned upon me that the fundamental principles of the art of gardening, architecture, interior decoration and music are the same—rhythm, harmony and balance. Possibly, these are also the basic principles of religion, which is the art of the inner life. Harmony must be in one's environment —the garden and the home are conducive to the harmony of the mind which one acquires by leading a life with truth for beacon light, by ignoring the pinpricks of life and making light of small annoyances, by emphasizing the essentials and by

ignoring the trivialities and the non-essentials. One finds that the essentials are the ideals of Truth and Beauty. Ultimately, the search for beauty becomes the search for truth and tree worship leads to life worship, and the bioaesthete becomes a biospher. While science attempts to extract truth from nature, art abstracts beauty. In bioaesthetics, science and art are wedded together and the ideals of Truth and Beauty coincide.

Chapter II

FORGOTTEN FLOWERS

FOREIGNERS who happen to see an *amaltas* or a *gulmohur* in bloom wonder at our neglect of such splendid material for beautifying our country. Why have we made no use of this wealth of rich colours, while we make futile efforts to grow cypresses which look so funereal and gloomy ? This is explained by our conservatism and lack of imagination. We are wedded to tradition and formalism and our designers of parks and gardens make pitiable attempts to produce clumsy replicas of Moghul and Tudor gardens which seem so out of place in our climate. Secondly, our materialism stands in our way and we judge trees by their economic worth alone. Unfortunately, most ornamental trees with beautiful flowers do not yield edible fruit, and I believe, the only honourable exception is the *kachnar* whose buds are curried or eaten in curd. This may probably explain the invasion of gardens of some houses by the *kachnar*. This reminds me of an incident which typically illustrates the mind of our moneyed *petite bourgeoisie*. While planning the garden of my house at Allahabad, I planted only ornamental flowering trees. This was highly annoying to a friend who was looking after this work, and incidentally had a fat bank balance of about a lakh of rupees. He had been expatiating at length on the virtues of planting mango and *kathal* trees in the compound of my house and was disappointed to learn that I wanted to plant only flowering trees. When he discovered a couple of *kachnars* among the rows of ornamental trees, he felt relieved and highly pleased. This was not on account of any appreciation for the purple blooms of the *kachnar*, but on account of the fact that *kachnar* buds were sold in the bazar at eight annas a seer. Personally, I would like to leave the *kachnar* buds alone rather than boil or curry them, for they appear far more beautiful when allowed to blossom into a heavenly mantle of pale-mauve, pink and white flowers.

Seldom yielding any edible fruit, the ornamental flowering trees have suffered neglect from our spiritualistic countrymen. It is only rarely now that trees like the *asoka* and *champaka* are found growing near temples, and the devotees pluck their flowers for the benefit of their idols. Our ancestors were not prosaic and dull like us. They had an aesthetic sense and loved the indigenous flowering trees. That is why *kadamba* is associated with Krishna and the red flowering *asoka* with Sita, wife of Rama. Where the Kosi river leaves the mountains there is a beautiful grove of *asoka* trees, and legend has it that Sita and Rama were so much enchanted by the beauty of their flowers that they made this grove, called Sitabani, as their home for some time. As the author of *Skanda Purana* relates, "Sita charmed by the beautiful forest, said to Rama, 'It is the month of *Baisakh*; let us stay in this wood

and bathe in the water of the river.'" So they made their abode there, and on their return to Ayodhya, the name of the place was changed to Sitabani, or the 'Grove of Sita'. Sita did not forget the charm of the forest trees and pleasures of the bath in the river. Surrounded by the palace luxuries of Ayodhya on return from exile, she still pined for the jungle. Says she to Rama, "I long once more to wander through the shades of the brown woods, and plunge amidst the waves of Bhagirathi's cool translucent stream."

The *asoka* tree is so much associated with the name of Sita, who is supposed to have taken shelter in a grove of these trees when pursued by the lustful demon Ravana while she was in his captivity in Lanka, that it is befitting to call this tree *Sita asoka*. This will also avoid its confusion with another tree, also called *asoka* (*Polyalthia longifolia*), which has dull green flowers and does not compare with *Sita asoka*. Red is the colour of passion, love and devotion. It is also the colour of blood and liberty. In Eastern countries, the red colour has an erotic significance. That is why this colour is used in the *Holi* festival by young men for smearing the faces of young women. The red flowers of *asoka* are also associated with Kama Deva, the Hindu god of love. Red is also the colour of the sun, the source of all life, and of Brahma, the Creator. In ancient Buddhist books it is related that the father of King Harsha daily offered a bunch of red lotuses to the sun-god as scores of people even now do in India.

If the degree of development of a culture is judged by the aesthetic level which the people reach, then we can safely say that the Hindu culture reached its heyday in the period of 100 to 500 A.D., from the reign of Kanishka to the close of the Gupta rule. During this period, flourished a number of outstanding personalities who added lustre to the annals of India. Of the poets and authors of this period, Ashvaghosha and Kalidasa deserve particular mention. Ashvaghosha, the spiritual preceptor of Kanishka, mentions a number of beautiful trees in his *Sundara Nanda* in which he describes the love story of Nanda, brother of the Buddha. He compares the broken-hearted Nanda trying to conciliate his mistress to a "*naga* tree (*Mesua ferrea*) broken down by the wind from its excessive burden of flowers". Describing the apathetic mood of Nanda pining for his beloved, he writes, "The *naga* trees there, though studded with flowers with yellow interiors as if with gold-fitted caskets of ivory, no more drew the eyes of Nanda in his sorrow". In his description of a jungle in the sub-Himalayas, he describes waving *kadamba* trees, and the *parijata* tree "shining with all the qualities of majesty, and playing the king over the *mandara* trees and other trees laden with the bloom of the day, water-lilies and red lotuses". Ashvaghosha compares Nanda's mistress to a lotus pond, "with her laughter for the swans, her eyes for the bees, and her swelling breasts for the uprising lotus buds".

However, it was in the fifth century A.D. when Kalidasa and Vatsyayana flourished, that the Hindu mind was fully in touch with Nature, the beautiful

trees and flowers and graceful *sarus* (cranes) with the countryside resonant with their melodious voices. Kalidasa describes the *asoka* tree in most of his plays, and in his *Ritusamhara* he gives charming descriptions of most of our indigenous beautiful trees which flower from month to month. In his description of spring, he describes the mango tree bent with clusters of coppery red leaves, and their branches covered with light-yellow fragrant blossoms shaken by the March breezes, which kindle the flame of love in the hearts of women. He describes the *asoka* trees with their graceful drooping young leaves hanging like tassels of silk, covered with coral red blossoms which make the hearts of young women *sasoka* (sorrowful). He describes jungles of *dhak* (*kimsuka*) resembling a blazing fire waving in the wind, making the earth appear like a newly-wedded bride with red garments. How aptly he compares the scarlet flowers of *dhak* with the bright-red beaks of parrots ! In his description of women's toilet he mentions that they paint their bodies with the fragrant paste of white sandal and cover their breasts with garlands of snow-white jasmines, and perfume their beautiful heads with *champaka* blossoms. In the rainy season, women decorate their heads with garlands of *kadamba*, *kesara*, *kakubha* and *ketaki* flowers. It is thus that Kalidasa describes the toilet of Shakuntala:

The *sirish* blossom, fastened o'er her ear
Whose stamens brush her cheek;
The lotus-chain like autumn moonlight soft
Upon her bosom meek.

After the Guptas we notice the decay of Hindu culture. The Hindu mind got so tarnished that it became completely oblivious of the beauty of buteas, erythrinas and bauhinias. Hindu poetry became stereotyped, completely lost the erotic charm of Kalidasa and degenerated into *bhajans*, the so-called devotional songs, which were colourless, pessimistic and insipid, and showed much concern for the next world for which the devotee was supposed to be preparing by fasting and prayers.

Our ancestors were much beauty-conscious. It is a shame that we, their successors who claim to be more civilized are aesthetically so dull. For most of us, our *amaltas* trees decked in the golden glory of their graceful, pendulous racemes of yellow flowers have been flowering in vain. This also explains why our *kachnars* with their March mantle of mauve-purple flowers have been languishing in obscure corner of our public gardens, and our lagerstroemias laden with pinkish-red flowers have been lying neglected in our parks and gardens. This has been the fate of the indigenous trees, and as regards the exotics like browneas, colvilleas, peltophorums and milletias, they are known only to the curious few.

Most of our good things are discovered by foreigners, while we who live surrounded by them are oblivious of their beauty or merit. Unless a certificate of merit

is obtained from a foreigner, a poet, a painter, an author, a dancer, or even a tree has very little value in our eyes. Tagore became known in his own country when the English translations of his poems reached Europe and won appreciation. Uday Shanker's worth was recognized in India only when his dances were extolled in Europe and America. We are grateful to appreciative Englishmen who have helped us in rediscovering our country and its culture. Havell rediscovered the virtues of Indian art; Roerich, Smythe and many others the grandeur of the Himalayas and Blatter the beauty of our trees. It is time the knowledge of beautiful ornamental trees is disseminated among all people, particularly among the younger people, so that their environment may become more cheerful and colourful and they may develop an aesthetic sense.

Talking about popularizing art, Roerich says that pictures should find a place not only in art galleries and museums, but also in hospitals and even in jails. When art invades jails, they will cease to be jails, for a man who can appreciate a good picture will no longer remain a criminal. Similarly, a human being who can admire beautiful flowers, ceases to be materialistic and his mind rises to a higher plane. So in the cultural development of a community or a nation, a bioaesthetic plan has a very important function.

Our poets have plenty of indigenous material for their poems in our beautiful trees, and yet how blind they are to the splendour of *kachnar* blossoms and even to the golden glamour of *amaltas* ! We should introduce themes on beautiful Indian trees in *mushairas* and *kavi sammelans*, and ask our poets to give us descriptions of *kachnar*, *amaltas*, *champaka* and jacarandas in their poems, so that we may gladden our hearts and revel in the beauty of their blossoms when their flowers are dead and gone. These poetical symposia will also afford us an opportunity of giving suitable names to exotic trees which have found a home in our country.

Chapter III

THE PAGEANT OF THE SEASONS

THE PAGEANT of the seasons in Northern India is truly exciting. The Hindu year is divided into six seasons, each season consisting of two months. *Vasant*, the spring, comprises the months of *Phalguna* and *Chaitra*. Summer scorches the countryside in the months of *Jyaistha* and *Asadha*. Then follow the rains from the months of *Sravana* to *Bhadra*. When the skies have cleared in the month of *Asvina*, autumn with its beautiful cloud-effects and golden sunsets begins, and in the month of *Kartika* the nights sparkle with moonlight. From *Agrahayana* to early *Pausa* is the early winter, the *Hemant*, when the climate becomes cool and bracing. From the latter half of *Pausa* to early *Magha* is the winter, *Sishir*, when there is biting cold, fields are covered with frost and snow falls in the Himalayas. According to prevailing temperatures, the year can be divided into four seasons—spring, summer, autumn and winter, which can be compared to the four parts of the day—the dawn, noon, sunset and the night. Spring corresponds to the dawn, summer to the noon, autumn to the sunset and winter to the night.

Vasant, the Indian spring, is heralded by the cooing of doves and the yellow flowers of *sarson*, which in the first week of February wave like a sea of gold. The *shisham* trees get covered with pale green silk-like leaves. Men and women wear saffron clothes and harmonize with nature. The merriest festival in ancient India was the *Suvasantaka*, the spring festival, celebrated in honour of Kama Deva, the god of love. Dancing, singing and merrymaking were organized in every village, in which both men and women participated.

The *kachnar* trees, which in February appeared so unattractive with their dark, leafless branches, produce a rich harvest of pink, white and purple-mauve blossoms, and for full one month they add colour and charm to the landscape. The delicate blossoms of *kachnar* trees fill one's heart with bliss and soothe the eyes. *Kachnars* are followed by *semal*, the giant silk-cotton trees, so common in the Kangra Valley. The gaunt limbs of the *semal* are decorated with cup-like scarlet flowers, and the tree reminds one of the goddess Lakshmi with numerous arms, holding scarlet lamps on the plams of her outstretched hands. The sombre mango groves suddenly begin to pulsate with life and produce pale-yellow blossoms in profusion. Attracted by the fragrance of the mango blossoms, *koels* come to the mango gardens, which are filled with the pleasant echoes of their calls. By the middle of March, spring is at its prime.

The twisted *dhak* trees, unworthy of notice in winter, shed their trifoliate leaves, and their twisted limbs get covered with dark brown buds. As if touched by a magic wand, the buds open suddenly, and the trees are ablaze with flame-like orange-scarlet

blossoms. Clad in the dazzling scarlet robe of *dhak* flowers, the earth looks like a young bride.

In the Kangra Valley, the fields and hedges are dotted with snow-white blossoms of *kainth*, the wild pear. A small unsightly bushy tree a few days ago, the wild pear flowers before the leaves unfurl in the last week of February, and becomes a dome of white blossoms. "I am the white song of creation," says the *kainth*. By the middle of March the young leaves open, fledging every tree with pale green silk, and provide garniture for clusters of silver-white blossoms. In hedge-rows, the yellow blossoms of *Vasant* are seen in profusion, and their pouting corollas are strangely significant of the spring season. Along the watercourses, thousands of gentians with turquoise-blue flowers provide a delightful frame to the fields of green wheat. In some of the fields, blue flowers of linseed are mixed with yellow blossoms of *sarson*, providing a delightful colour contrast.

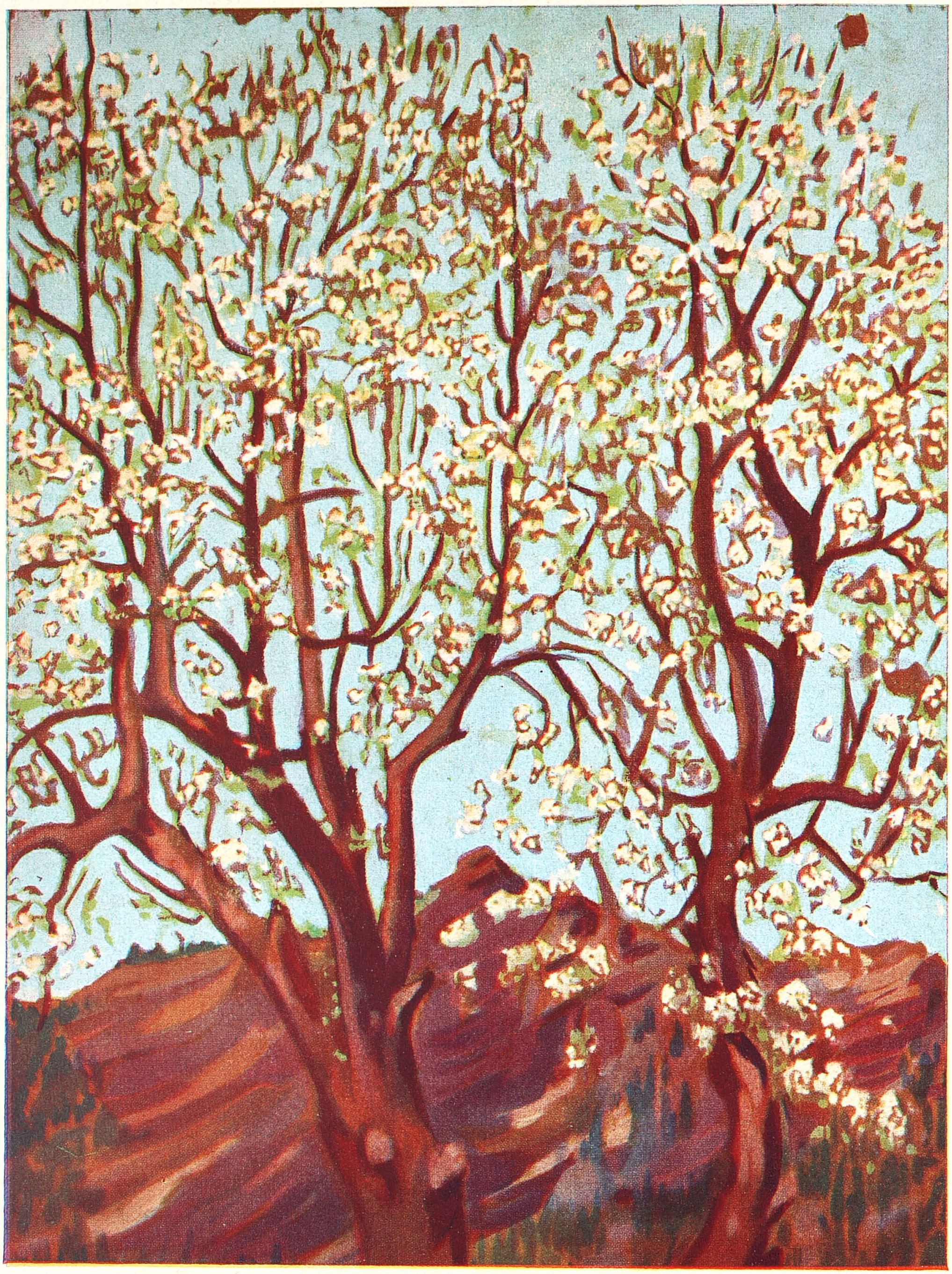
There is warmth in the air and lovers feel drowsy with amorous languor. Even days and nights have partaken of the colourfulness of *Phalguna*. *Phalguna* is the season of love, and the lovers long for *Phalguna* as the dark night longs for the full moon.

Swings are put up among the blossom-covered branches of trees in which bees are humming, enjoying the fragrance of the flowers. The spring is in full bloom and great are love and joy. Jasmines open their buds and fill the air with their perfume. The sky is clear blue like the Mansarover lake, and the sun and the moon are its giant blossoms.

The spring slowly ripens into summer. By the first week of April it starts getting warm. Most of the trees produce new leaves, and the umbrella-like *pakurs* get covered with coppery leaves and appear most charming. When the slanting rays of the evening sun strike the young leaves of *pakur*, they appear like a cloud of fire. In damp places, myriads of fireflies are seen twinkling like stars, and 'weaving aerial dances in fragile rhythms of flickering gold'. Dry leaves of trees fly about, and weird bonfires are seen under *mahua* trees. The air is heavy with the fragrance of *neem* and *sirisha* flowers, and the quiet of the night is disturbed by the rattling noise of *sirisha* pods. The rust-red young leaves of *mahuas* are tipped with gold in the rays of the morning sun. *Gulmohurs* are flushing into vivid scarlet, and it is getting warm.

Hot winds blow and scorch the vegetation. Dust devils are seen whirling into brown spirals, linking the earth with the heaven and sucking leaves and dust into their bodies. The fierce rays of the sun beat mercilessly on the coppery earth, and the atmosphere is filled with stifling dust. All men and beasts seek shelter in shade. Peacocks sit like statues amidst the trees and pray for rain. They are oblivious of the presence of peahens, who follow them in the shade of the trees. The hot, dry wind blowing over sand dunes produces mirages of rivers and lakes and attracts herds of deer for miles. Even tigers are fatigued and lie languidly in their caves. The whole firmament is aglow with the dazzling radiation of the sun. The lakes, which were

KACHNAR LADEN WITH ORCHID-LIKE MAUVE FLOWERS



WHITE BAUHINIA IN BLOOM IN KANGRA VALLEY

filled with ink and white lotuses a month ago, are drying. Thirsty buffaloes are wallowing in the mud with their tongues protruding. Forest fires cause havoc among birds and beasts, the denizens of the forest. Elephants, oppressed by the heat, rend the air with their trumpeting. Cobras leave their holes. Wayfarers seek the hospitable shade of mango groves, and quench their thirst from the *piayo*.

After the parching heat of *Jyaistha* and *Asadha*, clouds, the white elephants of Indra, appear in the sky, and provide joy to the farmers anxiously waiting for the rain, as well as to lovers in search of coolness. On sighting the purple clouds and hearing the thunder, peacocks shout in joy and spread their rainbow-coloured tail-feathers into gorgeous fans. The *kadambas* are covered with yellow ball-like flowers.

Rain-clouds drench the earth with the water of life, and the thirsty brown earth suddenly gets covered with a carpet of green grass. Velvet mites, the scarlet *birbahauties*—the brides of the heroes, make the earth look like a pretty woman decked with sparkling gems. The rain patters on the leaves of the mangoes and exquisite music flows from the crowns of the mango trees. Crowds of women and children wander in the mango groves in search of ripe, golden mangoes filled with nectar-like juice, which drop from the branches. The raindrops give birth to iridescent bubbles on the placid waters of the village pond, which after their momentary glamour, merge into the water of the pond.

The clouds have parted, and through the thin spray of falling rain we have a glimpse of the sun. A rainbow appears in the sky and it seems as if the earth and heaven meet on a seven-coloured swing. On the village common, buffaloes and cows are grazing the lush green grass, which the generous rain-clouds have provided. In the branches of the mangoes and the light green *shishams*, green parrots are flying. On the white flowers of the grass, saffron-coloured butterflies are beating their wings.

The moist air of *Sravana* is drenched with the fragrance of jasmines, and the Queen of the Night and *mehndi* exhale delicate fragrance. The white flowers of Gardenia are studded over the hedges like stars in the dark blue sky. "The golden-glowing *champaka* buds are blowing by the swiftly flowing streams."

Describing the toilet of women of his age, Kalidasa observes: "The women of Alkapuri rub the dust of *lodhra* flowers on their cheeks, *maghya* flowers decorate their temples, *kuruvaka* flowers hang from the knots of their hair and *sirisha* flowers decorate their ears. In the monsoon, *kadamba* flowers glorify the heads of these charming women and they carry pink lotuses in their hands". Even now the women of Maharashtra decorate their tressknots with the white *champaka*, "the moon hanging by the mountain", and wear bracelets of jasmine round their wrists. Garlands of jasmine and *bela* are popular all over India during summer, for we have always had a sensitive appreciation for the fragrance of flowers. While the Europeans feasted their eyes on colour and developed beautifully coloured flowering annuals, Indians packed their gardens with sweet-smelling flowering creepers, shrubs and trees.

Rivers are swollen with turbid water, in whose mighty current large trees uprooted from the banks are tossed about like straw. Clouds rumble ceaselessly, and in the dark night, water drips continuously from the leaves of trees and creepers shaken by the powerful wind. The bees have forgotten all about honey and the fragrance of flowers, and are hiding themselves in heaps.

Sravana is the month of lovers, amorous and passionate. In the cool and fragrant breeze of *Sravana*, lovers who are parted feel unhappy and long for each other. Brides, away from their husbands, feel sad. Lovers who are united, watch the dark rolling clouds and the flashes of lightning. Cleaving the dark clouds with their golden legs are flights of white cranes, who provide a thrill to the lovers drunk with the joy of the rainy season.

The rains have ended. The atmosphere is free from dust particles and haze, the sky is deep blue and the air cool. In the autumn, glorious sunsets are seen. The earth is covered with silver grass tipped with white blossoms like yak's tails, which wave gracefully in the air along the banks of rivers. In the blue sky float pure white rainless cumulus clouds, like cotton-wool scattered by the bow of a wool carder. The autumn-flowering *kachnars*, the *kovidara* trees, are laden with thousands of pink-purple flowers which invite myriads of bees.

In the Kangra Valley, the *padam*, the carmine cherry, is a never-to-be-forgotten sight. The *padam* with its carmine blossoms dangling in clusters, seen against the blue Himalayan sky lighted by the rays of the setting sun, appears like a cloud of fire. "I am the rose-cloud of pleasure floating in the dream of the autumn," says the *padam*. The leaves of the oaks are rich brown, and the maples and chestnuts with their golden brown leaves stand out conspicuously among the other trees of the forest.

On the banks of the rivers, *sarus* (cranes) amble gracefully, and flights of ducks can be seen gliding from the mountains to the *jheels* in the plains. Farmers are harvesting paddy and the roofs of their houses are covered with amber cobs of maize. The moonbeams dance on the white panicles of silver grass, transforming them into magic pillars. The night is filled with silvery radiance, and the sand in the dried beds of mountain ravines sparkles like diamonds.

The month of *Magha* announces the arrival of winter. The days have shortened and the nights have lengthened. The sky is dark blue with not a patch of cloud. A cold wind blows from the mountains and men and cattle seek warmth in the nooks of houses. *Kachnar* trees have shed their leaves, and their bare branches appear "like the naked swarthy *gopikas* of Vrindavana, whose clothes and jewels Lord Krishna has stolen in a divine mischief".

As the sun rises, life quickens and the villagers, draped in blankets, sit in sheltered sunny nooks of the courtyards of their houses and on roof-tops. The air is like champagne, bracing and invigorating.

Chapter IV

TREES IN MODERN INDIAN ART

AFTER discovering the beauty of our trees in the present and the past, I felt how inadequately our trees had been painted by our artists. A tree laden with flowers, is a great joy to the beholder, but its glory is all too brief. These fleeting moments of joy can be perpetuated only in the form of paintings. Mere words, I realized, could not adequately convey the beauty of the bauhinias and the buteas. To my amazement I found that most of our modern artists were blind to the beauty of our trees. Our forests contain a wealth of trees, only a few of which, I found, had attracted the attention of our contemporary artists.

The Himalayan forest trees have a personality of their own. The smooth-leaved *kharshu* oaks with their drooping branches laden with festoons of lichens look like Himalayan hermits with matted locks and convey the impression of age and wisdom. The stately firs appear like well-groomed soldiers guarding the sanctuary of Shiva, the god of the Himalayan snows. The twisted *banj* oaks with the dark ugly knotted stem draped in a coat of moss and epiphytic ferns, give a sombre appearance to the Himalayan forests, toning down the sparkling red blaze of the rhododendrons.

The stately deodars with their smoke-like planes and spire-like crowns are really the monarchs of the forests. They are, in fact, aristocrats of the Himalayan forests, nurtured by the golden breasts of the daughter of Himachal. That is why they hold their heads high, and stand upright, looking so distinguished among all the forest trees. The forest of Manali in the Kulu Valley, with the deodar trees growing on a plateau interspersed with moss-covered boulders, reminds one of a scene from Shakespeare's 'A Midsummer Night's Dream'. The deodar forest along the bank of the Khajiar lake near Dalhousie on the way to Chamba is unrivalled in stateliness and grandeur.

The search for the Tree Beautiful on canvas thus led me to artists like Bireshwar Sen. I knocked at the door of the Art School at Lucknow and met this amazing little man, and was able to divert his attention from the Himalayas to flowering trees, and he and his pupil Lakshmi prepared a number of sketches of flowering trees. Their sketches of moulmein rosewood showing the purple-mauve flowers of the tree against the background of tamarind are beautiful. Sen has also painted the colville's glory, the purple bauhinia and the pink cassia.

Lakshmi's painting of *asoka dohada* in which he has illustrated the theme of the awakening of the *asoka* flowers by a beautiful maiden, is a landmark in the tree art of India. The *asoka* covered with drooping tassels of light green leaves and bunches of orange-scarlet flowers has been painted in exquisite colours and the young maiden

in her gaily coloured drapery, in a joyous mood, greatly enhances the beauty of the tree.

Then I came across Serbjeet Singh and Ganga Singh. It was left to young Serbjeet to paint the forests of deodars. His picture of a hill dance near the Khajiar lake effectively conveys the sombre atmosphere of a deodar forest. Serbjeet Singh has also painted the alder glades of the Kulu Valley. A group of Kulu men and women in colourful costumes standing on a bridge with clumps of alders on all sides is a picture of great beauty and artistic merit.

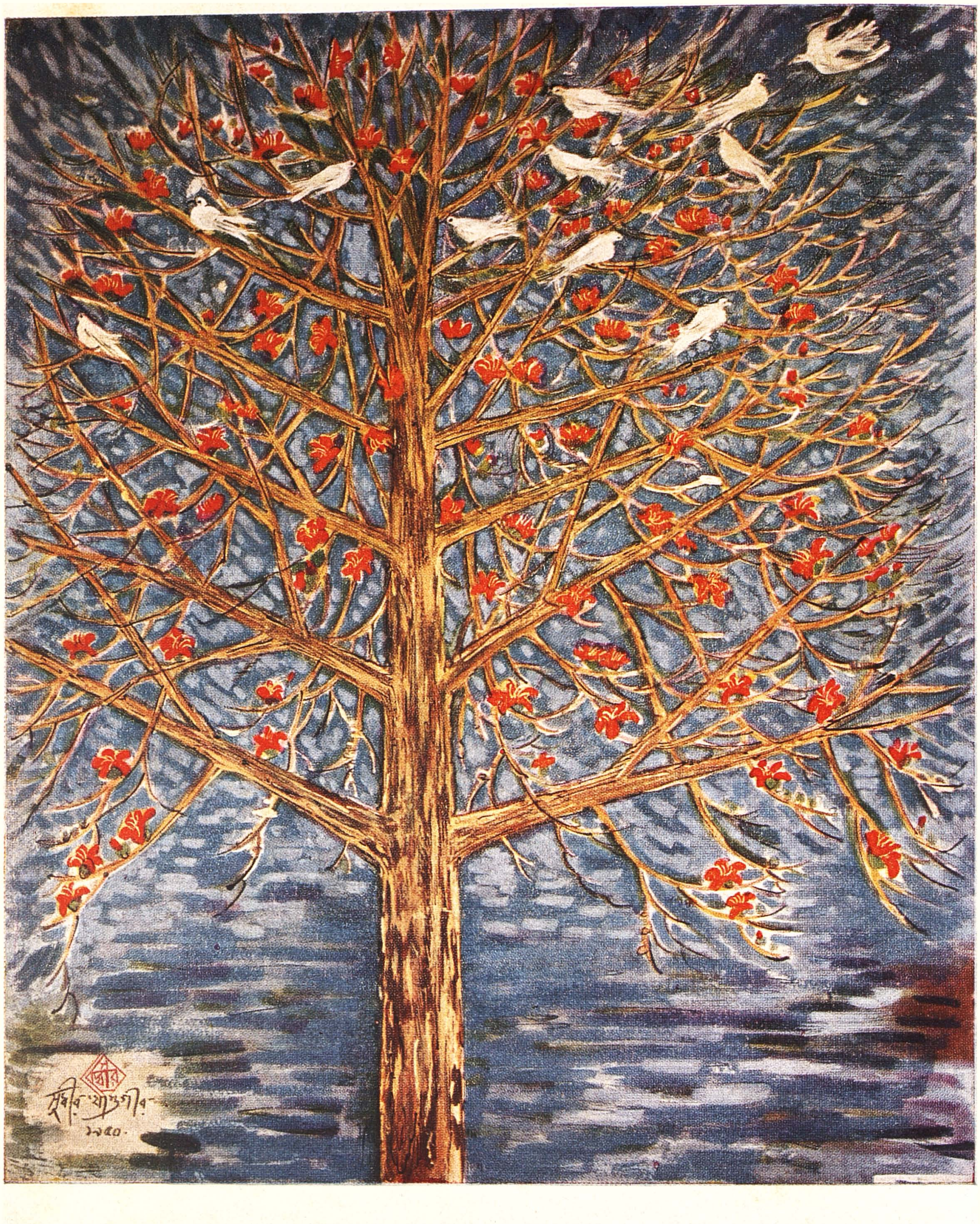
Ganga Singh's paintings of flowering branches of beautiful trees of India faithfully depict the shape and colour of flowers, leaves and branches. For their accuracy and freshness of colour, his paintings stand unrivalled.

Ganga Singh, who was attached to the Forest Research Institute, Dehra Dun, as its official artist, is admittedly one of the best plant artists of the world. He was mainly patronized by British officers and their wives. Lady Willingdon acquired a collection of his paintings which decorate her home in England. In Delhi, a small but representative collection of his sketches of flowering trees, shrubs and creepers can be seen in the Botany Division of the Indian Agricultural Research Institute.

A larger collection of his paintings can be seen in the Forest Research Institute, Dehra Dun. It is said that some of these paintings are so life-like that they even attract bees and butterflies. Most of the plant sketches of Ganga Singh are botanical in character and are painted in water colours. Recently, he has adopted the oil medium and has painted flowering branches of *asoka* trees and red flowers of *Rhododendron arboreum*. The Flame of the Forest, which has provided themes to so many plant artists, has been painted by Ganga Singh so vividly that one actually feels the presence of a living tree.

It was in Delhi that I met the garrulous Anil Roy Choudhry, who attracted my attention by his very beautiful paintings 'Santhal Girls' and the 'Flame of the Forest'. He is one of the few Indian artists who have painted some of our flowering trees. His 'Santhal Girls' is a picture of outstanding merit. Against a background of orange-scarlet *dhak* flowers, the pair of swarthy Santhal girls decked in coloured beads and trinkets appears rather attractive. The flame-like beauty of butea lends glamour to the girls who reflect the glory of the butea blossoms and provide a pleasant contrast.

In their treatment of the tree theme, Gopal Ghose and Manishi Dey are a class by themselves. Their rendering of the Tree is novel and original. In his Coral Tree, Gopal Ghose has drawn the tree, which is common in Bengal, in an impressionistic style. By a few strokes of the brush he has successfully portrayed the character of the coral tree. This painting seems to be an essence of the tree world, expressing the nature, and not merely the likeness, of a coral tree. Manishi Dey's sketch of *amaltas*, the Indian laburnum, is also unique. By an exaggerated treatment of the



THE SILK-COTTON TREE LADEN WITH SCARLET FLOWERS

racemes of yellow flowers of the *amaltas*, Manishi has been able to convey, in a remarkable manner, the character of the tree while in bloom.

Down in the South, I met Madhava Menon, the artist of Kerala, who has painted trees and animals of South India with extraordinary sensitiveness and feeling. His paintings of bamboos and frangipanis are extremely beautiful and compare with the work of old Japanese masters in delicacy and simplicity. In Madhava Menon, the white-stemmed Plumeria of Kerala has found her most sympathetic interpreter, and one almost feels the presence of this glorious tree which adorns many parks and gardens in Trivandrum.

The credit for painting the colourful flora of Sikkim goes to a frail young woman artist, Devyani Kanwal Krishna, who has the unique experience of extensive travel in the forests of the Eastern Himalayas. She has painted the coral trees, rhododendrons and orchids of Sikkim with great feeling. Seeing her paintings of the Himalayan trees, shrubs and climbers is a rare treat; one feels as if one is wandering in the mountains and valleys of Sikkim clothed with extraordinary variety of purple, mauve and crimson rhododendrons, while from the trunks of stately trees, pink, mauve and pale-yellow orchids sway gracefully in the cool breeze of the Eastern Himalayas.

Sudhir Khastgir, who has been impressed for years by the graceful rhythm of the female dancing figure, has recently turned his attention to beautiful trees. *Amaltas* and *palas*, the trees of the forest, have attracted him and he has interpreted these colourful trees in paintings of extraordinary power and passion. His painting of *amaltas* with the tree bending under the load of golden flowers swaying gracefully on a group of village girls returning from the well in the forest carrying red earthen pitchers, is beautiful. The limpid tropical earth, hot and aroused, seems to be blossoming with the joy of creation. He has shown the *palas* in the full blaze of its spring glory, and the white doves in the sky look as if they are escaping from the scorching flames of the tree.

Francis Brunell, a French artist and diplomat who lived in Delhi for many years, was also attracted by the beautiful trees of India. His paintings of Indian trees have a character of their own and are unrivalled for the freshness and delicacy of colour. A collection of his tree paintings can be seen in the Public Library at Mehrauli near the Qutab Minar, Delhi. *Amaltas* is his favourite tree. His 'Forest of Gold', showing a clump of *amaltas* trees, laden with yellow flowers against the blue sky of May with a yellow haze in the horizon, is thrilling. His paintings of flowering branches of *amaltas* showing its golden-yellow flowers against a light blue background are exquisitely beautiful. Brunnel has also painted the flamboyant, and has successfully depicted the flame-like beauty of its scarlet flowers. His paintings of apple and peach trees of Kashmir are characterized by softness of colour, and show a charming contrast of blue and white.

It was, however, a Hungarian artist who really captured the beauty of the

jungle trees of India. My acquaintance with Madame Sass Brunner and her daughter Elizabeth was made through their book 'Mystic India' which contains a selection of reproductions of their paintings. These tree paintings aroused my interest in the work of the Brunners, and I undertook a journey to Nainital and met them in a house called 'St. Cloud'. There I was shown a wonderful array of tree paintings depicting the graceful palm trees on lotus lakes, venerable banyan trees meditating on the banks of the Ganges and flaming *gulmohurs* against the blue sky of May.

Madame Brunner is one of the most sympathetic interpreters of Indian trees. Among her numerous studies of India's famous trees, the Flame of the Forest features in a good many. When the tree sheds its leaves and is clothed in scarlet blossoms, it fills the forest with its radiance. Against the background of a blue sky, the scarlet flowers of the Flame of the Forest stand in glowing contrast. Madame Brunner's paintings of this tree are remarkable for their accuracy, depth and brilliance of colour. She has faithfully delineated the form of the tree, and has been able to convey the atmosphere of the *dhak* forest in natural colour.

Having spent a considerable part of her life in the Himalayas, Madame Brunner has studied the moods of trees in different seasons. For instance, her painting of poplars in a leafless condition in winter reflected in the waters of the Jhelum is a charming study in lines. She has also painted the saffron terraces and the *chenar* trees of Kashmir. The yellow autumn tints of the *chenar* contrasting with the sombre green of the pine forest and the blue sky with cumulus clouds in the background, remind one of autumn in the Himalayas. In another painting, she has shown the same tree in a leafless condition in winter, covered with snow. A group of ravens sitting on its branches in a mournful manner provides an interesting contrast, and is symbolic of winter. The same tree covered with green leaves with a carpet of yellow flowers below, reminds one of the spring season in the mountains.

The wild cherry tree with its pink blossoms is one of the most beautiful trees in our mountains and is a favourite theme of a number of Madame Brunner's paintings. She has painted this tree in various forms: with its black, gnarled stem and branches covered with pink blossoms against the blue sky and the white Himalayan snows in the background. The mountain ebony, or the white bauhinia, which flowers in March, is one of the most beautiful trees which grow in the plains as well as in the mountains. Its white flowers are a symbol of youth and purity and nobody has painted them more beautifully than Madame Brunner.

The rhododendrons with their scarlet bunches of flowers and the *banj* oak tree with its twisted branches covered with festoons of lichens, enliven the Himalayan landscape in April. Madame Brunner has painted the oak in all its moods. She has painted the *banj* oak in winter when it is leafless and its gaunt crooked branches are covered with dark brown lichens, and in summer when it is draped in dark green leaves. Her rhododendrons truly depict the spirit of the spring in the Himalayas.

The weeping willows of Nainital with their graceful pendulous branches waving in the mountain breeze, and ivy creepers clinging to oaks and alders also find a place in some of her paintings. Even jacarandas with their purple-mauve flowers, which almost defy pictorial description, have been successfully painted by her.

The banyan tree, a symbol of wisdom and of tropical luxuriance, is a favourite with the villagers and the folklorists in India. Madame Brunner's paintings of the banyan present great artistic merit. Her painting which illustrates a procession of women in colourful clothes carrying pitchers of water, and long, rope-like aerial roots of the banyan dangling in the humid air, depicts a familiar scene in the rural life of South India. No doubt, Madame Brunner's paintings will be loved and admired by all lovers of trees.

But, besides these artists and a few more, there is a great void in India regarding the flowering trees in art. One reason for this neglect of the tree in the art world is the ignorance of the artists who come from urban middle class families, and never stir out of their classrooms or studios to study nature at first hand.

It is time the curse of conventionalism was lifted from Indian art and the spell of Ajanta which has stifled all originality, broken. It is not implied that the frescoes of the Ajanta caves are not beautiful and lack the merit which is commonly attributed to them. The pictures which the Ajanta artists have left us are undoubtedly beautiful creations. They have an appeal to aesthetes, for they faithfully represent the everyday life of the people of that age, apart from the excellence of their technique. The artists of Ajanta undoubtedly painted pictures of great merit, but their greatness should not become an Old Man of the Sea on the shoulders of our present-day artists. We who live in the twentieth century, the most eventful era in human history, sometimes become victims of escapism, and out of sheer cowardice seek relief from the painful reality which is life by imagining a Golden Age, a *Satyayuga* of the past, and peopling it with mythical heroes. We see the sad spectacle of Indian artists who are blind to the beauty of snow peaks and flower-filled valleys and colourful trees. Our artists should live in the present and observe their surroundings with eyes wide open.

Let them open their eyes to the beauty of their mountains, rivers and trees. What a wealth of colour is sprayed in our countryside from month to month !

Chapter V

TREES IN INDIAN FOLK-SONGS

"O SHISHAM tree of my village, at least you remember me !" exclaimed an old man as he affectionately embraced the tree. "You are still standing by the roadside where I left you twenty years ago !" He had returned from Shanghai to the village of his birth in the Punjab. Nobody had come to receive him at the railway station, nor could he recognize any of the persons who were present there. He hurriedly left the platform and rushed to the tall, shady tree by the roadside. His attitude symbolized man's time-honoured love for trees.

In India, planting of trees has always been regarded as an act of piety. The hospitable shade of a *neem*, a banyan or a *pipal* comes as a boon to the weary traveller who has to undergo the ordeal of walking on a dusty, shadeless village road in the countryside. These trees have been sanctified in folk-lore and religion. It was under the shade of a *pipal* that the Buddha obtained the inner light, and many generations of Buddhists have worshipped it as the sacred Bodhi tree.

To the aborigines of India's jungles, trees mean a good deal more. The words for tree and house are practically the same among some of the aboriginal tribes of India and Ceylon. The Veddas of Ceylon, who still live in the forests, use the Sinhalese word *rukula* for a hollow tree as well as a house, and thus remind us of the primeval times when the ancestors of mankind lived in hollow trees and caves. But as the society passed on from the hunting to the agricultural stage, the tribe continued to hold the ancestral trees in reverence. Though the jungles were cleared for cultivation, groves were invariably left in the clearings. The village grove was also the refuge of the dispossessed spirits. Every tree possesses a spirit, as the tribal lore emphasizes, and even today the tribesman formally seeks the permission of the spirit of the tree before applying his axe to it. Certain tribes attributed intellect and consciousness to sacred trees; rarely, a tree was even endowed with the power of speech which could be heard in the rustling of its leaves. A tree may suffer from the evil eye. A slight offence may annoy the spirit of a tree; an elephant, it is said, once ate a leaf of a banyan, and died within three days. Sacrifies are offered to sacred trees, and votive offerings are hung on their branches.

At the birth of a Lama, as the Tibetan legend emphasizes, all the withered trees surrounding the birthplace put forth green leaves to show that a holy child is born. Every country has thus celebrated the tree theme. In Sweden, for instance, a popular ballad describes how, when a young nymph danced, the leaves of a tree accompanied her harmoniously. Similarly, in India again, the legend of the girl who was killed by her brothers and was transformed into a tree has many versions; it has perhaps travelled

POPLAR AVENUE IN KASHMIR

THE GOLDEN-YELLOW BLOSSOMS OF AMALTAS BRIGHTEN UP THE FOREST

to every country of the world. The youngest brother of the girl who was innocent, came to the tree to pluck flowers; the tree spoke in human voice and revealed the tragedy. In another version, the girl was murdered by her step-mother, who openly repented for her evil act when a minstrel sang at her door; it was merely by chance that the minstrel cut a branch from the tree that grew out of the blood of the girl, and with this branch he made the bow for his *sarangi* that produced a most heart-rending lament.

A group of tree legends centres round the magical qualities of certain trees. For instance, it is said that a tree grows over the tomb of Tansen, the famous musician of Akbar's durbar at Gwalior: anyone who would chew its leaves would attain an exceptional sweetness in his throat. The attendant ladies of Lalla Rookh aptly assert that the poet, who sang love songs to the princess, must have chewed the leaves of the tree that stood over the tomb of the great musician.

In aboriginal India, the bride and the bridegroom are asked to walk several times round a tree before the marriage takes place; the bride smears the *mahua* tree with vermilion and embraces it. The bridegroom, on the other hand, performs a similar ceremony with the mango tree.

The legend of the origin of the mango tree shows the poetic flight of the Indian folk-mind. The daughter of the sun-god threw herself into a pool to escape the persecutions of an enchantress, and changed herself into a lotus. A king saw the lotus flower and desired to possess it. But the enchantress burned it and from the ashes of the lotus arose the mango. The king saw the flower and fruit of the mango, and he decided to keep the ripe fruit of the mango with him; as the fruit fell on earth, from it came out the daughter of the sun-god who was recognized by the king as having been his former wife.

Perhaps, at every birth in the village, the mango tree sends forth green leaves. Thus, even today, as the Hindu tradition maintains it, new mango leaves are brought and hung over the door of the house where the housewife has given birth to a son.

An attempt to discover the tree theme in the vast panorama of India's folk-songs must take into account the great funds of legend and religious belief from the five-thousand-year-old Mohenjo-Daro period down to recent times.

As one surveys the tree theme that has directly or indirectly touched the mind of the folk singers, one finds scenes from the daily life of the past depicting a society of lovers of trees coming back to life. To plant a *pipal* or a banyan near the village temple or by the roadside has been recognized for ages as a great social act.

In almost all Indian languages, trees form the subject of many folk-songs. Sometimes, they are used as mere pegs to hang human emotions on, and they become symbols of man's joy or grief. Occasionally, they are personified and they express their own feelings as in the following song:

The *semal* tree meditates:
Why are my flowers red ?
Why are not my flowers offered to gods and goddesses ?
Why doesn't the *mali* make garlands of them ?

In the *Song of the Trees* translated from Kashmiri, the trees are again personified to give expression to their sorrows.

I, the gardener's daughter, longed for a mate,
Slowly, slowly, the new spring came.

The apricot tree made a request to God:
I am named 'the late comer';
So early though I blossom;
I shall be useful to the peasant at wedding time.
Slowly, slowly, the new spring came.

The *poplar* tree made a request to God:
I am named 'the auspicious one';
Why bear I no fruit ?
The peasant stands awaiting my fall,
So that he may use me as a beam for his house roof.
Slowly, slowly, the new spring came.

The *chenar* tree made a request to God:
I am named 'the goddess';
Why bear I no fruit ?
Though my cool shade pleases the whole world.
Slowly, slowly, the new spring came.

The willow made a request to God:
I am named 'the hero';
Why bear I no fruit ?
Alas ! in my youth my body becomes hollow.
Slowly, slowly, the new spring came.

The pear tree said before God:
I am named pear and fruit I bear;
I give cool shade as well,
It pleases the Bahavakhar.
Slowly, slowly, the new spring came.

This song has assumed different versions in different villages, yet the central theme has never altered.

"Father, never cut this *neem* tree," is the beautiful opening of a song from Uttar Pradesh. Translated from Awadhi, it is classified as *hindole ka geet* or swing-song. When sung in chorus collectively by young girls on swings, it gives an unusual thrill:

> Father, never cut this *neem* tree,
> The *neem* offers rest to sparrows.
> Father, never trouble your daughters,
> Daughters are like the sparrows.
> All the sparrows will fly away,
> The *neem* will feel so lonely.
> For their fathers-in-law will all the daughters leave.
> Mother will feel so lonely.

The *neem* symbolizes the mother to whom daughters are like sparrows; when they leave it for their new homes, the tree feels lonely like the mother whose daughters leave her one by one, as they get married.

A fragment from a mystic song of Kashmir brings the *deodar* into bold relief. Thus sings the mystic in the mood of a lover:

> In the forest I stood as a strong *deodar*,
> To lay me low there came to me the invincible angel of death;
> Such was my fate,
> I lost my *houri* while yet I was young.

A marriage song, translated from Marathi, also deals with the tree motif. It is sung while the people are busy erecting the *mandap* or the marriage marquee:

> The mango tree talks to the *jambul* tree,
> Let us go and invite the *umbar* tree,
> I had sown the *umbar* seed.
> Thirty-three crores of gods witnessed it;
> Let every tree be an *umbar*, O *umbar* tree.
> Your branches have spread everywhere,
> The other has gone to the underworld,
> The third has come to the *mandap* of Ramraj.

The following song from the Punjab is an epitome of the vicissitudes through which a sapling has to pass before it grows into a tree:

Tree, O tree, said the parrot,
Firstly, your soil is bad,
Secondly, your stem is old.
Neither my soil is so bad,
Nor my stem so old.
Firstly, the Nabob Sahib's she-camels have eaten me,
Secondly, the carpenters cut away the beams,
May the mourners in batches visit the carpenters' houses,
May the Nabob's she-camels all expire,
And may the wise old Nabob himself expire.

Another song from the Punjab provides a peep into Indian village life. It is sung by a girl whose soldier husband is away at a distant cantonment and does not care to write to her:

O *pipal* of my birthplace,
Your shade is cool;
Water in our pond is dirty,
The leaf-powder from its surface I set aside.
Lachhi and Banto have gone to their husbands,
And whom shall I tell my story ?

Often the tree has its tale of woe to tell as in the following song from the Simla Hills:

O cruel woodcutter,
Cut merely my lower branches;
Do not stretch out your axe towards the top,
O leave it for the birds' nests.

In aboriginal India, songs are wedded to dance. The song given below is sung in chorus by the Maria Gonds of Bastar in praise of their land:

In our land, O girl,
Oh, in our land, dear girl,
Stretching our hands we can pluck the mangoes, dear girl.
Oh, stretching our hands we can pluck the mangoes, dear girl,
Never a scarcity of mangoes, dear girl,
Oh, never a scarcity of mangoes, O girl,
If you drink toddy, O girl,
Oh, if you would drink toddy, dear girl,

You would drink to your heart's content, O girl,
Oh, you would drink to your heart's content, dear girl.
Gods with their own hands, O girl,
Oh, gods with their own hands, dear girl,
Have planted the palm tree, O girl,
Oh, they have planted the palm tree, dear girl.

Verrier Elwin has a *karam* song from Rewa; the Gonds follow the method of direct statement:

Plant the mango, plant the tamarind and plantain:
Clusters of fruits will weigh their boughs.
Plant ten *kachnar* trees for flowers;
In a garden set the *tulsi*.
Water them unweariedly, but they will always wither.
But the trees in the forest,
Which depend on God alone,
Never wither and die.
The forest trees grow always.

Trees can always add colour to life. Tribal poetry everywhere gained in power and charm whenever it touched the tree motif.

The *jangalis* of the Punjab sing scores of *dhola* songs with a common opening address—"*Butt vanota* !" *Vanota* is the *peelu* tree (*Salvadora persica*) which is known as *jal* in the West Punjab, *Vanota* is from Sanskrit *vana* or forest. It means that *peelu* is the lord of the forest, *Butt* means body or 'living personality'. Thus, *Butt vanota* may be translated as "O living *peelu* tree !" Here is a popular *dhola* song that opens with the symbolic address:

O living *peelu* tree !
Your roots are gone deep into the soil,
Well-shaped is your stem since your birth,
Over it your branches have added colour.
My neighbours are all ready for the journey,
Drums have announced the news.
Undoing my hair, I have turned an ascetic woman.
I have put on the sacred thread of *mala;*
Follow your path, I searched for you in streets and lanes.
In what town should I search for you now ?
I enquire from astrologers and Brahmins,
No prediction has so far told me the path you followed indeed.

Across the river I stand—I, a woman who cannot swim,
Bundle of clothes in hand;
Bring your boat here, O boatman,
How can I stand here waiting and waiting ?
Lo ! I fall on the earth, seek my death,
Turn but once your she-camel homeward,
Once at least you can bring life to a poor soul like me.

This is the method of the *jangali* folk-songs; the woman represents the human soul, and the never-ending search of the soul for God is the theme of the *dhola* songs. Again and again, the *peelu* tree is addressed in the opening line of the *dhola* song as if it understands the human voice, and, when the search for God seems to bear no fruit, the singer looks towards the old forest tree for advice.

The tree motif is dear to the village mystic; in varying forms it usually adds to the vitality and depth of feeling of the singer as seen in the following pieces from the Punjab.

i

O dry *pipal* leaf, why are you rustling ?
Fall now, old leaf,
Lo ! the season of new leaves has come.

ii

Listening to the songs of trees
My heart is illumined.

iii

The *pipal* sings; the banyan sings,
And the green mulberry, too:
Stop, traveller, and listen,
Your soul will be set right.

iv

Under the banyan tree,
I happened to see God Almighty.

v

Tell me, O *pipal* tree,
Which is the path to Heaven.

vi

O silent *pipal* tree,
Do open the knot of my soul !

vii

The banyan knows the secrets;
No good telling a lie in its presence.

But the mystic appeal cannot be shared equally by all. Generally speaking, it is the life of the people that provides a fertile soil for the tree motif. Here are, for instance, few Bhojpuri *birha* songs:

i

The bamboo-grove where I played with friends,
O it never fades from my mind;
A flute shall I make of bamboo from the same forest,
The *birha* shall I sing from door to door in the village.

ii

Our goddess feels hungry, brother,
She asks for milk to drink.
Shall I milk the banyan or the *barohi* tree ?
My *raina* cow has gone a long way off.

iii

Rama and Lakshmana left for the forest,
And Sita accompanied them;
Rama and Lakshmana felt thirsty,
Sita gave them nectar mixed with water.

iv

In one forest an ant wanders,
In one forest a cow wanders;
In one forest wanders the daughter of the Ahir mother
With bells fastened on her breasts.

v

The east wind blows and I just yawn;
While standing, my body is filled with lassitude;
Who is the dandy whose gaze fell upon me ?
The home and the forest, O neither of them would please me.

vi

No more looking after the cows,
No more bathing in the Ganges,
No more friends' company under the *neem* tree,
These three things God Almighty took away from me.

vii

On the branches of the mango, a bunch of mangoes looks lovely,
In the forest, the *palas* trees are blossoming;
In the lap of the fair bride the child looks lovely,
As though the moon appeared on the sky.

viii

On the branch of the mango the *koel* sings,
In the forest the peacock dances;
On the river bank I sing my *birha*,
It pierces the heart.

Again and again one wonders how much the Indian folk-songs owe to the tree that adds colour to the local landscape. The villager, as he takes to the oldest songs, conjures up the past. One may say that even a mere reference to a tree is a reminder of the past, for it reminds the singer of his ancestors who lived in the forest in the olden days.

W. G. Archer, poet, scholar and administrator, spent many years among the Oraons of Chhotanagpur. This lovable Englishman has provided us with a remarkable collection of Oraon folk-songs translated into English, conveying as much as possible their beauty in his book entitled 'The Blue Grove'. *Phagua* and *Sarhul* are the main festivals of the Oraons, celebrated in the months of March and April when the mango groves in the outskirts of Oraon villages resound with dance and music. Describing these festivals Archer writes:

"The *Phagua* festival occurs in March and is the Oraon equivalent of New Year's Eve—seeing out the old year and bringing in the new. It marks the end of the marriage season and the period of relaxation after the harvest.

"The ritual consists in setting up some branches of the silk-cotton tree, wrapping them in straw and offering some country bread and incense to them. The branches are then burnt and the festival ends in dancing and drinking.

"The *Sarhul* festival comes a month later, and has a double significance. In one aspect, it is a 'vegetation' ceremony—an act of rejoicing in the jungle which has already come into flower. In the other, it is a 'fecundity' ceremony—a marriage of the earth with the sun on the assumption that the soil is ready to be quickened. The fertility of the jungle is used, as it were, to stimulate the fertility of the fields. From one point of view, therefore, the appearance of blossoms on the *sal* trees is an indispensable prerequisite of the festival.

> Over the *sal* trees the children of the moon are dancing,
> The drum is of gold,
> The drum is of silver,
> The sticks of copper sound in the noon.

"From the other, an indispensable preliminary is that the ploughed fields should be left bare to the sun for a month prior to the festival. Finally, the element of rejoicing involves drinking and dancing, while the fecundity aspect is seen in the mimic marriage of the earth and the sun.

"The ritual commences with ceremonial baths by the men and women and the stacking of some selected rice in winnowing baskets. A grindstone is then put in the courtyard of the house of the *pahan* or village priest and on it are placed three bundles of straw and a yoke. The *pahan* and his wife sit on the yoke while the *pahan's* assistant, the *pujari*, sits to their right with his wife. A mimic marriage is then gone through—the *pahan* representing the sun and his wife the earth, while the *mahto* or village headman officiates by putting oil and scarlet powder on their heads. Rice beer is then offered by the headman to the village ancestors, and later, some of the stacked rice is sanctified by the priest and put aside for use at sowing. There is then a procession to the village *sarna* or sacred grove, where fowls are sacrificed to the village ghosts and to

the sun-god. The sun-god is asked to bless the *Sarhul* and make it merry and to grant prosperity to the village in the coming year. The *pahan* then returns to his house for a ceremonial drenching, and after that there is a men's feast in the grove composed of rice and the sacrificial fowls. This is followed by a women's feast in the *pahan's* house, and the night passes in general drinking and dancing.

"The festival has for the Oraons the gladness of Easter Day—an exultation in the brilliant weather and the flowering trees, and the sense of sprouting life."

There are many references to trees in Oraon folk-songs. *Plumeria acutifolia*, also called the life-and-death tree, is usually planted by the shrines dedicated to Mother Earth, *Devi Mai*, in almost every Oraon village. The creamy-white blossoms of this tree are very popular with the Oraon girls.

"The life-and-death tree blossoms
Slowly swinging
In the morning and the sun
Slowly swinging."

"Near the spring is a life-and-death tree,
Throw stones, *juri*, and I will catch the flowers,
If you throw stones and get me the flowers,
I will let you dance the *bheja* with me."

Herons and egrets sitting on the tall *pipal* trees growing on the sides of the village ponds is a common sight in the villages of Chhotanagpur. Under the *pipal* trees cows and buffaloes have their afternoon siesta. Says the Oraon folk-singer:

Under the *pipal* tree the black cows are sitting
A heron sits on the *pipal* tree.
Who was the girl who broke a branch
And sent the sitting heron flying from the tree.

Hare, this is my lot
The *pipal* tree
O girl, two *pipal* trees
How sweet
Unripe how bitter
Ripe how sweet
O girl half ripe
Sweet as honey.

The fig tree laden with a bumper crop of figs is a symbol of fertility. A young girl ripe for marriage has been likened to a fig tree:

Walking, walking on the path, mother, I saw
The fig tree blooming, I saw the fig's blossom
A hundred blooms were smelling, mother, spreading for twenty miles
Over forty miles the blooms were smelling.

Again the ripe girl has been symbolized by the blossom-covered *munga* tree:

You planted a *munga* tree, father
The *munga* has spread its branches
The *munga* is in blossom
The bees hum and fly
They come to suck the honey.

In the month of August, another festival is celebrated by the Oraons known as the *Karam* festival. It is thus that Archer describes this interesting festival:

> "The centre of the ritual consists in cutting three branches of a *karam* tree and their installation in the dancing ground. The branches are called the '*Karam Raja*'. The entry of the branches into the village is accompanied by dancing, and after the installation, *Karam* dancers revolve round the Raja through the night. The following morning the branches are garlanded and the *karam* legend is recited. Flowers are then thrown over the Raja and offerings of curd and rice are made. Red *karam* baskets full of grain are also put before the branches, and some ceremonially nurtured barley seedlings are distributed among the boys and girls who put the yellow blades in their hair. The blessing of the *Karam Raja* is then sought and the branches are taken up and carried by women through the villages. A halt is made at the houses of the village *pahan* and *mahto*, the Oraon religious and secular heads, and at each house the branches are anointed with the oil and scarlet powder which are part of the apparatus of a marriage. The branches are then thrown into a stream."

"It is considered both meritorious and exciting," says Verrier Elwin, "to plant trees. The Gond or Pordhan who does this generally has a great desire to perpetuate his name, and looks forward to a prosperous old age."

We may mark this phase of aboriginal life in the light of the following Gond folk-song:

How young I was
When I planted the mango
And still the leaves are full of life
But there is none in my old body.

Verrier Elwin rightly says that "The old man who planted mango and tamarind trees in his youth finds himself jealous of the vigour of their fresh green leaves and contrasts it with the lack of strength in his own limbs."

Here is a Bhil song translated by D. P. Khanapurkar. It seems to bring out the *pipal* tree as a symbol of grace and character in view of the names of the chiefs of the Dangi Bhils that are mentioned in the song:

Oh, King Somansing,
Your throne is of gold
Oh, it is of gold
Your speech is silvery
Oh, it is silvery
Oh, *pipal* tree,
Your leaves appear golden.

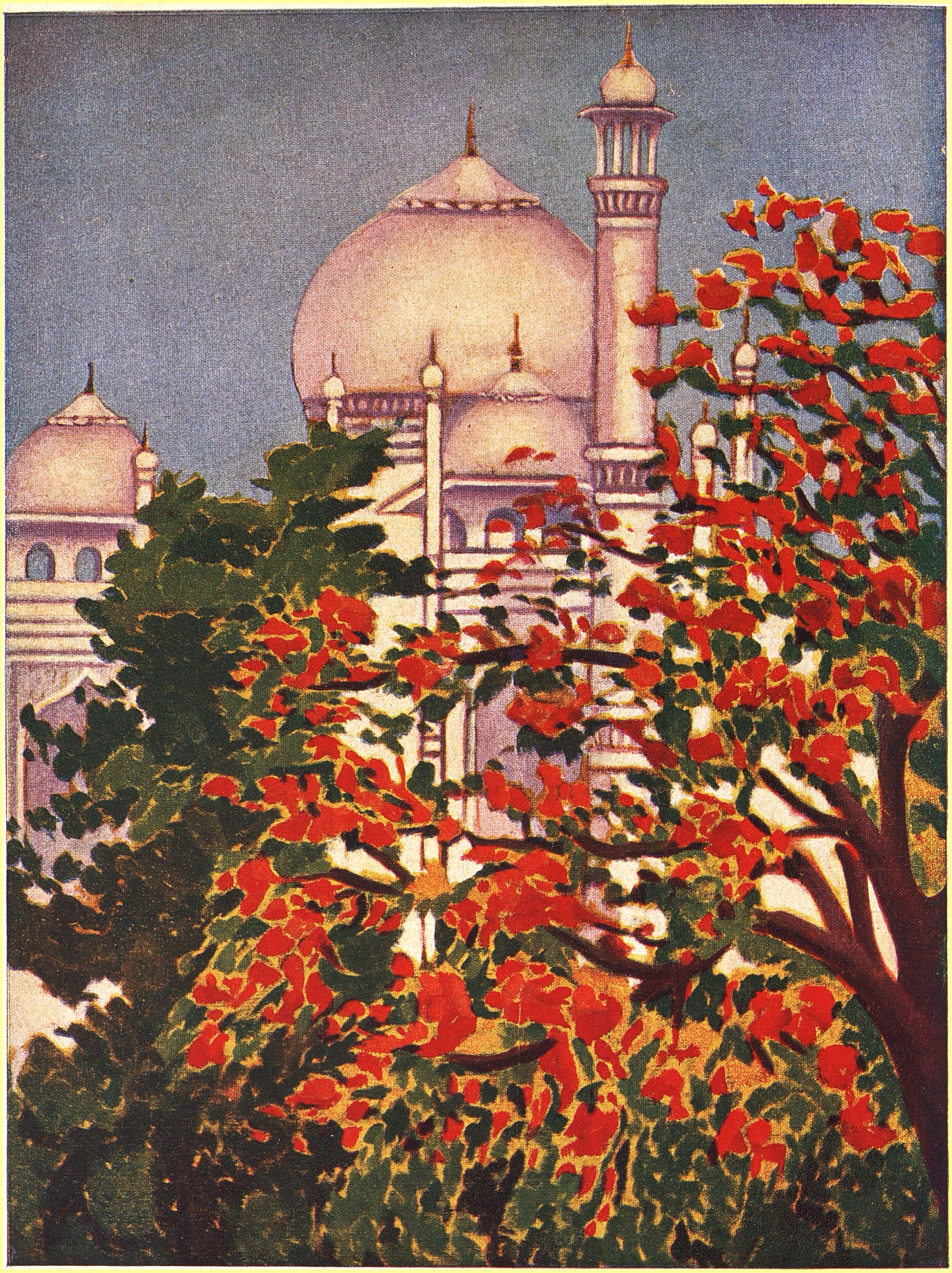
Oh, King Chandarsing,
Your throne is of gold
Oh, it is of gold
Your speech is silvery
Oh, it is silvery
Oh, *pipal* tree,
Your leaves appear golden.

Oh, King Sahebu,
Your throne is golden
Oh, it is golden
Your speech is silvery
Oh, it is silvery
Oh, *pipal* tree,
Your leaves appear golden.

Oh, King Anandrao,
Your throne is of gold
Oh, it is of gold
Your speech is silvery
Oh, it is silvery
Oh, *pipal*, your leaves are golden.

THE PAGODA TREE BEARS LARGE CORYMBS OF FRAGRANT WHITE FLOWERS

SILVER OAKS IN BLOOM



The image of the elder brother's wife persists in many hill songs, as also in another Garhwali song that centres round the willow (*majnu*) tree:

Who you are, O man, sitting in the shade of the tree ?
Besides water stands *majnu* tree.
Sitting in the shade, do not break its branches.
Who you are, O man, sitting in the shade of the tree ?
Besides water stands *majnu* tree,
My uncle built its stone enclosure,
My aunt brought stones and clay.
Who you are, O man, sitting in the shade of the tree ?
Besides water stands *majnu* tree.
My brother got it fenced,
Steadily did my sister-in-law nurture it.
Who you are, O man, sitting in the shade of the tree ?
Besides water stands *majnu* tree,
It stands erect, full of pride,
And reminds me of my dear ones.
Who you are, O man, sitting in the shade of the tree ?
Besides water stands *majnu* tree.
Sitting in the shade, do not break its branches.
It grieves my heart
To see it assailed.
Who you are, O man, sitting in the shade of the tree ?

Most hill songs are composed round trees and are sung at village rituals. The following songs from Himachal Pradesh are good examples of this type:

i

The cones are growing on the pine trees,
The *deodar* trees have borne *koka* cones;
O I saw men, many men,
But your glances are unique.

ii

O green *koomshi* plant of the valley, you are green, ever green
O I'll win the man of my heart, else I will die.
The young man left me stealthily,
Kindling the fire of love in me—a branch of a tree.

The following love song from the Khondhs of Orissa projects the image of the *aru* tree, along with a *mahua* and a mango:

On the hill-top stands a *jaru* tree,
Flowers blossom on the *jaru* tree;
One flower for you, darling,
One flower for me.

On the hill-top stands a mango tree,
The pollen appears on the mango tree;
One blossom for you, my boy,
One blossom for me.

On the hill-top stands the *mahua* tree,
Flowers blossom on the *mahua* tree;
One flower for you, darling,
One flower for me.

Here are the opening lines of a beautiful Malayalam folk-song:

Says the landlord, "Trees are green but you are withered."
I say, "I will die to be born a tree on earth !"
Blow, blow, O sea breeze, tell your tale,
The landlord never hears our wail,
O Earth, O Sun, I see no justice.

The tree motif, either forming the background or the theme itself, is seen in the following folk-songs, translated from Kannada:

i

It is cool under the *neem* in summer,
The Bheemavati river, too, is cool, mother,
You are cool at my birthplace.

ii

The bird of the sandal forest flies swiftly,
He must be knowing the secrets of the trees, mother,
He loves the fragrant breeze.

iii

The fig tree stands at the door of the barren woman,
Parrots sit on every branch and say:
'O barren woman, your life is for others.'

iv

Better be mud than a barren woman,
For on the mud will grow a tree,
Giving shelter from the sun to the sons of man.

v

The road to the weekly market is lined with trees,
At the weekly market I left my boy,
The trees kept away their flowers with grief.

vi

Safe are the sandal trees; we are planted by the gods:
We love the land where the peacocks dance,
And the sandal trees are our companions.

Some Punjabi songs mention the sandal tree as in the *Song of Lachhi:*

Aha, where Lachhi washes her face,
There a sandal grows—where Lachhi washes her face.

Another Punjabi song brings in the *shisham* and mulberry trees:

Where shall I plant the *shisham* trees—
All full of leaves ?
O my youth with a slim body,
Where shall I plant the mulberries ?
Oh, the old fool would not follow me.
In the garden shall I plant the *shisham* trees,
All full of leaves.
O my youth with a slim body,
At the door of the house I shall plant the mulberries.

Oh, the old fool would not follow me.
Full one span have grown *shisham* trees—
All full of leaves,
O my youth with a slim body,
Full one span have grown the mulberries.
Oh, the old fool would not follow me.

The old fool is the husband who would not help the young bride in planting the tree, and it seems, at every step she is thinking of leaving him for good.

In its earliest forms, the Indian folk-song was inseparable from the tree motif, as the community lived close to the forests and was never cut off from the real roots of inspiration.

Man has always taken pride in his relationship with trees. Since the early dawn of culture, he has learnt to call every tree by a name. An urge to discover something new in the image of the tree may be seen in the poetry of every tribe.

"There is a dumb bird that sits on a beautiful *sal* tree. Shake the tree, and the bird awakes and sings." This is a Gond riddle. The answer is "the anklets on the feet of a girl who goes to the dance jingle musically". Like folk-songs, even riddles and proverbs of the people in India have been enriched by frequent reference to the tree motif. And even folk-tales have celebrated the importance and beauty of trees in India.

Trees have provided inspiration to humanity for thousands of years. While human beings enjoy youth which is only transient, trees remain youthful for many years. Every year they produce new leaves and new flowers which bring joy to us. The annual rejuvenation of trees like *kachnar* and pink cassia and their magic mantle of mauve and pink flowers gladden the heart of the lover of nature. Planting of beautiful trees, which has lately become increasingly popular in India, will provide richer themes for our folk-songs and will beautify our country.

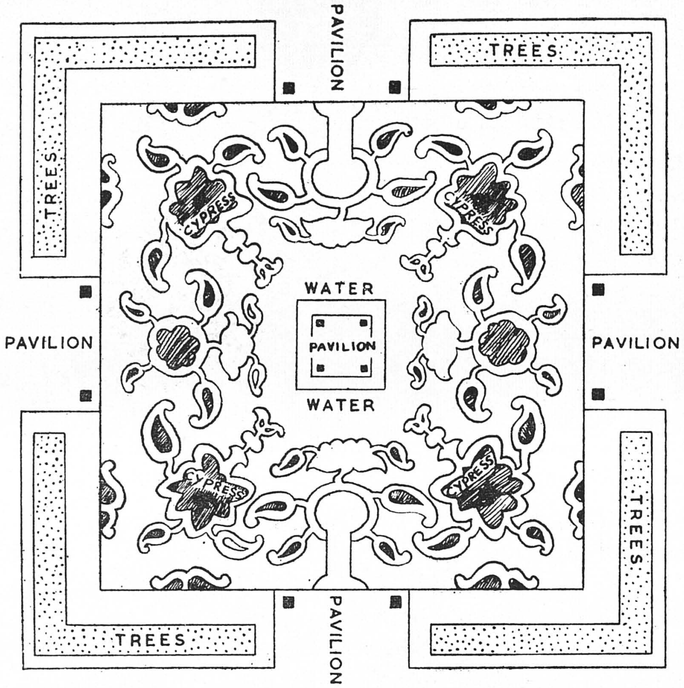
CHAPTER VI

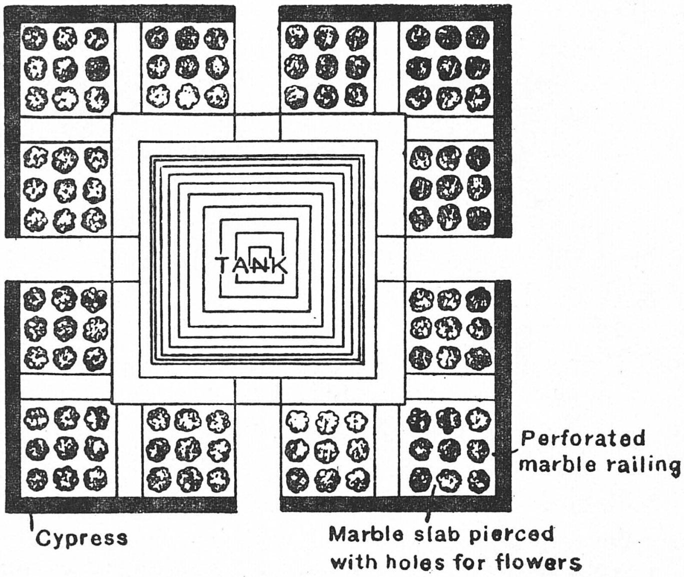
THE HINDU-BUDDHIST GARDENS

THE Aryans of the Vedic times were lovers of Nature. They had great love for trees and flowers, and the very name they gave to flowers, *Sumanasa*—that which pleases the mind—reveals their aesthetic sensibility. In the *Rig Veda*, they have sung praises of the mighty forces of Nature which bring rain and thunder. They loved the mighty rivers swirling and foaming in the monsoons, and the forests filled with quaint flowering trees which enlivened the landscape with their flaming orange and yellow colours. The Ganga with her life-giving water, descending from the Himalayan glaciers to the dusty plains of north India, the whole firmament aglow with the dazzling radiation of the sun, the morning haze on the lotus lakes, wide open spaces of land covered with *palash* trees laden with scarlet flowers, the hot dry wind blowing over sand dunes producing mirages of rivers and lakes attracting herds of deer for miles—such was the wondrous land of *Aryavarta*, the land of lotus and sunshine.

In the plains of northern India, the scorching heat of the sun burns all herbaceous vegetation, and wild flowering annual herbs are very rare. This climatic factor considerably influenced Indian gardening in the Hindu-Buddhist periods, so that their gardens were predominantly devoted to the growth of ornamental flowering trees, to the exclusion of flowering winter annuals which could be grown only with the aid of artificial irrigation in winter. The only flowering annuals which they grew were *gainda* (marigold), amaranth and *tulsi*. Of these, marigold and amaranth are easily grown during the rains and require practically no watering.

The Buddhist priests planted groves of flowering trees around their temples. They had plenty of leisure, and they lived in peaceful surroundings conducive to tranquillity of mind. Such conditions are ideal for the craft of gardening. In fact, the evolution of gardening is intimately associated with the temple and the monastery. While the Buddhist monks of India grew groves of flowering *asoka* and *kadamba* trees, the Chinese monks preserved rare trees like the *Cryptomeria* and the *Ginkgo*. The *pipal* was especially sacred to them as the Bodhisatva received enlightenment under a *pipal* tree and became the Buddha, the Englightened One, and hence it is also called the Bodhi Tree. As long ago as 260 B.C., Emperor Asoka planted banyan and mango trees along the roads to give shade to the wayfarers. On the seventh pillar edict of Asoka at Delhi is the following inscription: "God's beloved, Priyadarshi king says, to give shade to human beings and quadrupeds, I planted banyans and mango trees."





PLAN OF A GARDEN IN ONE OF THE ISLAND PALACES AT UDAIPUR (TOP)
PLAN OF A COURTYARD IN THE MAHARAJA'S PALACE AT UDAIPUR (BOTTOM)

MATHURA SCULPTURES

Some very interesting bracket and railing pillar figures of 'Woman and Tree' design, dating from the reign of Kanishka (78-101 A.D.) were discovered by Dr Fuehrer, Curator of the Provincial Museum, Lucknow, from 1888 to 1891 from an ancient site known as Kankali Tila, near Mathura City. In one of these, stands a beautiful woman in the nude, in a languorous pose under a flowering *asoka* tree. In another is a woman with luscious rounded breasts holding a sword in one hand, and touching the golden ball-like flowers of a *kadamba* tree with her uplifted hand; the gentle curves of her young breasts harmonize with the spherical *kadamba* flowers. There is another exquisite female figure surrounded by clusters of leaves and flowers of a tree resembling the *champaka*. According to Coomaraswamy these figures of women and trees represented fertility. Among the trees which are associated with the birth of the Buddha are *asoka*, *sal* and *palash*. A woman under a flowering *asoka*, *sal* and *palash* tree is the symbol of the mother of the Buddha. These figures apart from being symbols of fertility also depict the intense love of those people for flowering trees like the *asoka* and *kadamba* and what they regarded as beautiful and pleasing in their everyday life. Who would not adore the yellow, orange and red bunches of flowers of the *asoka* peeping out like fairy lamps from coppery-red drooping bunches of glossy, silk-like young leaves! The *asoka* seems to be one of the few trees which attracted the attention of the Aryans when they came to India. This tree is mentioned in the *Ramayana* and Sita while in captivity in Lanka is supposed to have hid herself in a grove of *asoka* trees while pursued by Ravana. *Asoka* is the harbinger of spring and allayer of sorrow, and is held sacred to Shiva.

There was a common belief in ancient India that the trees had their guardian spirits, the *yakshas* and *yakshis*. A *yakshi* figure under a mango tree is seen swaying from one of the gates of the Sanchi Stupa. A woman under a mango tree is also seen in fragments of railing pillars from Mathura. Such figures are, in fact, seen in most of the ancient sculptures from Bharut, Sanchi, and Mathura and in the temples of South India. These *yakshi* figures were worshipped for the gift of children.

Trees were commonly regarded as symbols of fertility. There is a story in the Mahabharata of a mother and her daughter who embraced two trees and thus became mothers of Viswamitra and Jamadagni. Banyan trees were in special favour with those who wanted the boon of children. In the *Dummedha Jataka* it is mentioned that people worshipped the *devata* of a banyan tree for sons and daughters, honour and wealth. In the *Hatthipala Jataka* is the story of a poor woman with seven sons who says: "I prayed to the deity who lives in this banyan tree, and he answered my prayers by giving me these boys." Similarly, the *pipal* tree was also worshipped by women desirous of children.

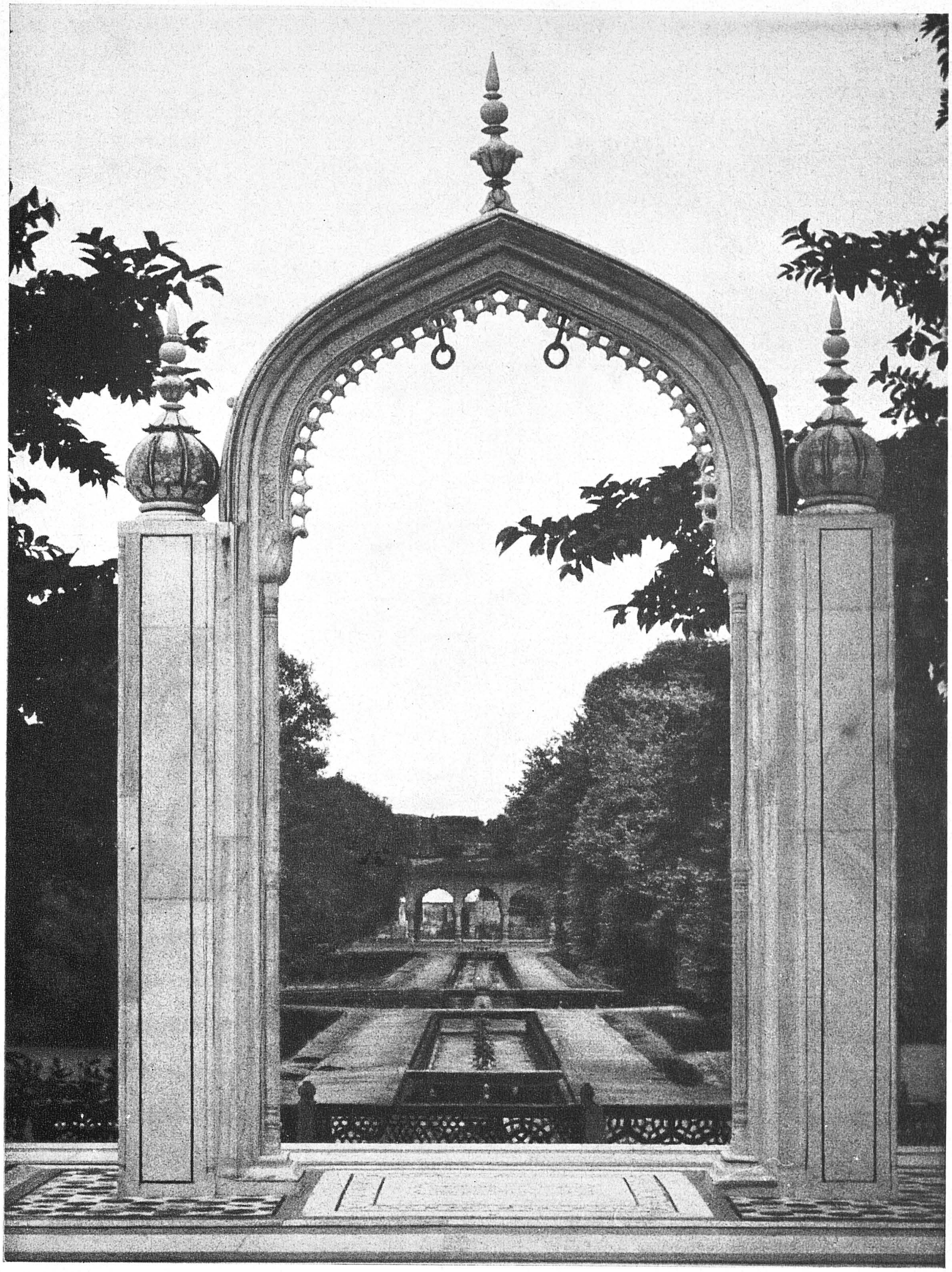
AJANTA TOILET SCENES

The murals in the Ajanta caves, the quintessence of Buddhist art, which date from 100 to 600 A.D., not only show the high level the art attained in that period but also give us a glimpse of the life of the common people in those times. Some of these pictures show wreaths of flowers in the hair of women. The ladies wore garlands round their necks and bracelets of flowers round their arms. In fact, flowers formed an integral part of their toilet. We also see a gaily attired woman holding a blue lily in one hand lying languorously on a brightly coloured bed.

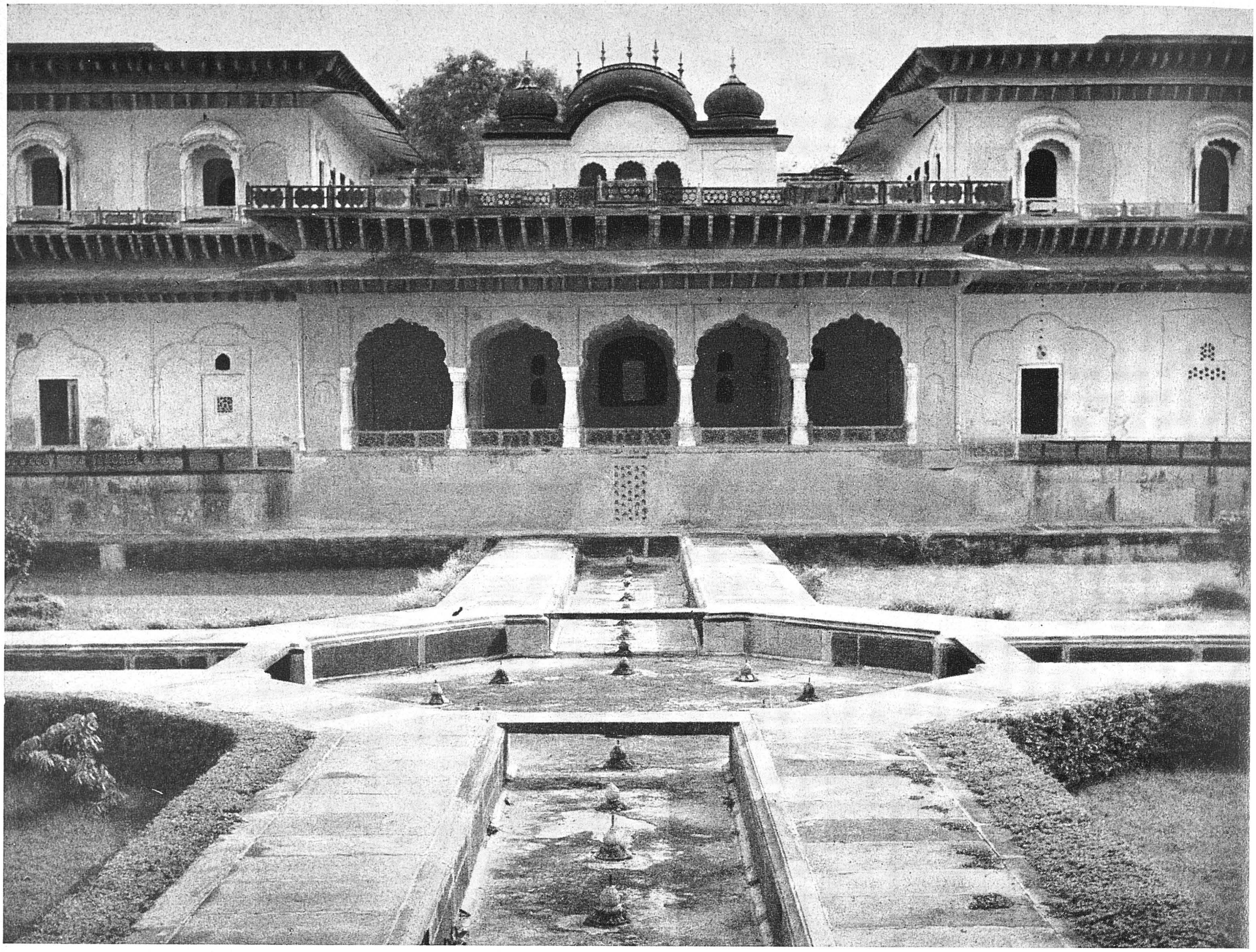
Shakuntala, clad in tree-bark and decked with garlands of flowers, meets her lover Dushyanta under the shade of an *amaltas* tree laden with golden-yellow flowers. Her ivory-like body is draped in garments prepared from the bark of trees and her graceful thighs resembling the stem of a plantain in shape and smoothness, are dimly visible from beneath her scanty primitive drapery. Her throat is like a white lily, and her coy smile reveals her white pearl-like teeth. Wreaths of white jasmines are twined in tresses of her jet-black hair, and lying on a bed of white jasmines under the *amaltas* trees, she is a sight for the gods. When Dushyanta comes to her, her rose-petalled lips quiver with joy, and her dark fawn-like eyes are filled with passion. What a charming woman, what a flame like beauty ! The air is filled with the rich fragrance of incense floating to the lover's nest from the hut of Kanva Rishi, and pink lotuses stand out on tall stems in the lake in front of the lovers. The winds are heavy with the rich colours of gardenias, and the lovers, absorbed in each other, are lost in a world of erotic sensations.

There was a favourite festival celebrated in spring known as '*asokapushpapra-chayika*', the gathering of *asoka* flowers, when young women collected *asoka* flowers, decked themselves in gorgeous clothes and inserted orange-scarlet bunches of its flowers in the mops of their glossy jet-black hair. The *asoka* tree is so much associated with young and beautiful women, that a tree was supposed to flower only when its roots were pressed by the feet of a charming young girl, who kicked it at the conclusion of a dance with her left foot. Kalidasa has most charmingly portrayed the scene of awakening of *asoka* flowers in his play, *Malavikagnimitra*. Malavika, the heroine who is in love with Raja Agnimitra, performs a dance under an *asoka* tree. On seeing the trees she says, "So this is the *asoka* which wants the touch of my feet. It has not yet decorated itself with flowers." She dances, and hits the *asoka* with her left foot and remarks with maidenly pride, "This *asoka* would be too mean if it does not flower even now." No wonder the *asoka* was held in such high esteem; no garden was regarded complete without it in those joyful days of India.

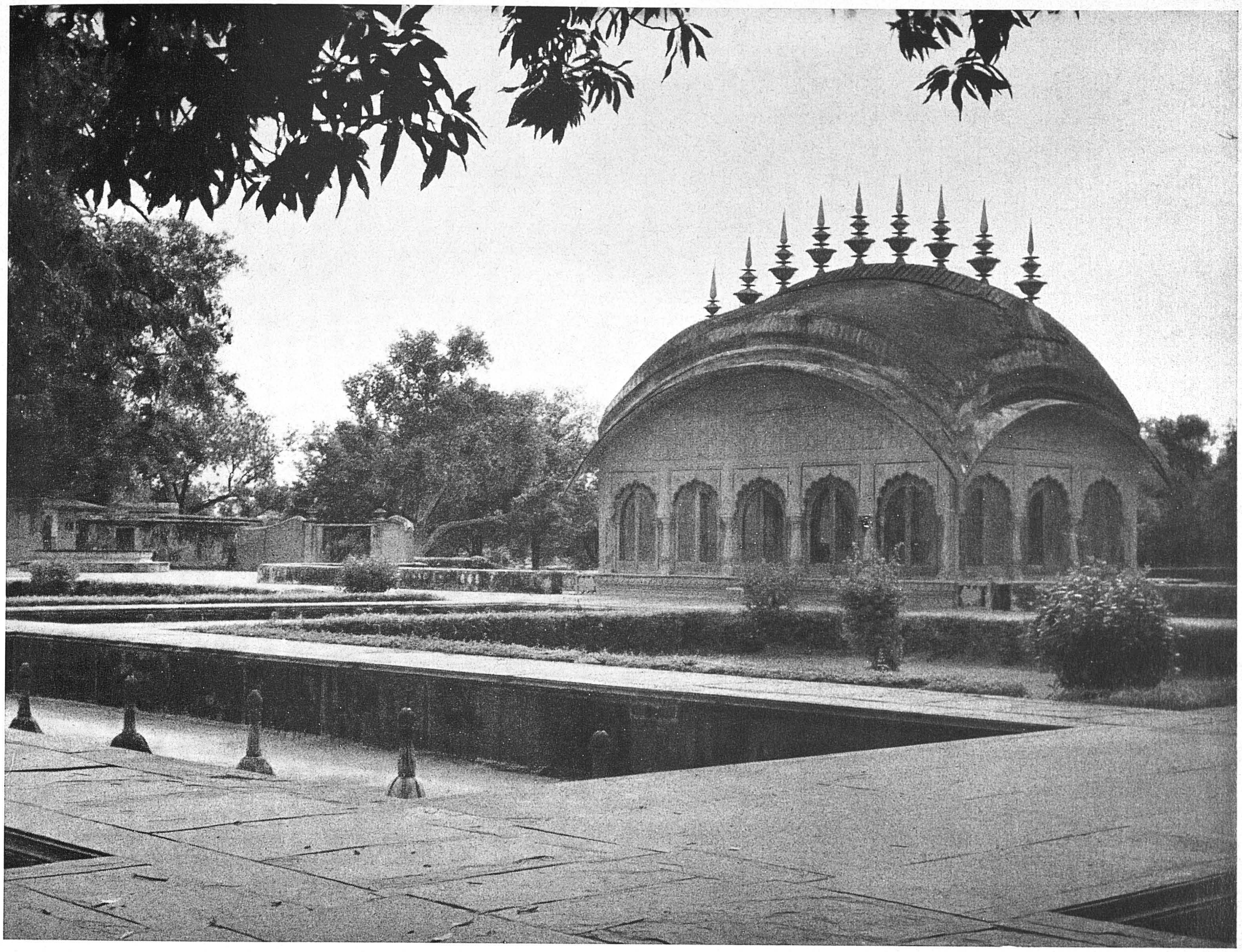
The *kadamba* gets covered with yellow ball-like flowers in contrast with its glossy, light-green leaves in July. It is usually associated with Krishna who is shown playing his flute in the company of Radha under a flowering *kadamba* tree. Krishna



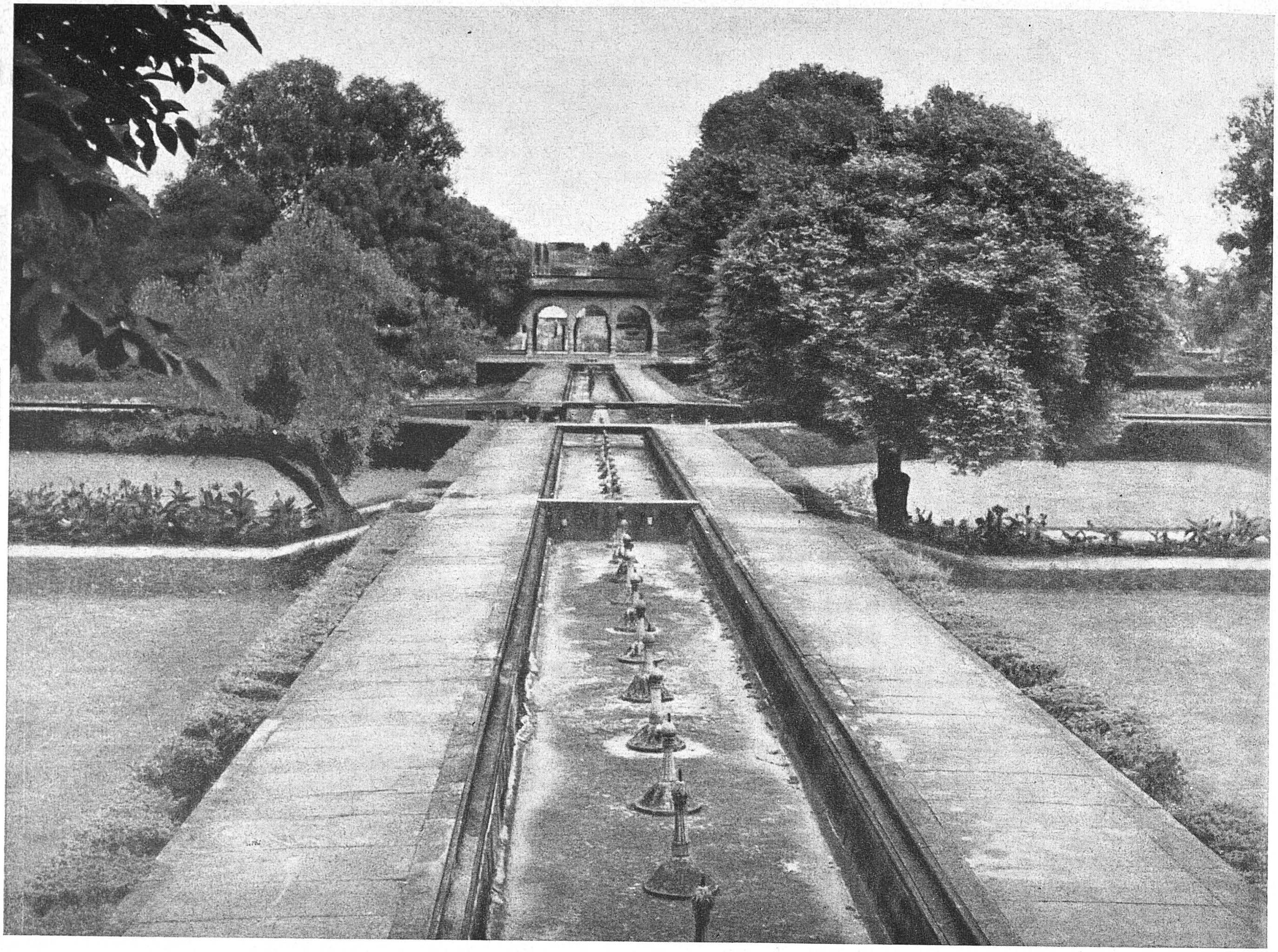
MARBLE SWING IN DEEG GARDEN, BHARATPUR, RAJASTHAN



A PALACE IN DEEG GARDEN, BHARATPUR, RAJASTHAN



GOPAL BHAVAN, DEEG GARDEN, BHARATPUR, RAJASTHAN



FOUNTAINS IN DEEG GARDEN, BHARATPUR, RAJASTHAN

lived near Mathura, and the popularity enjoyed by the *kadamba* in this area is shown by the pictures of Krishna under the *kadamba* tree and from those bracket figures of women already mentioned.

Women learnt the art of arranging flowers on the floor in beautiful geometrical patterns, of weaving garlands, and preparing perfumes. Perfume of sandal was poured into the bath, and the rich people used to dip in this odorous water and came out fragrant and pleasing. In the famous drama of Kalidasa we read about *khas*-scent being put over the breasts of Shakuntala while on her wrists was a loose bracelet of the stem of lotus (*kamalnal*). Cool and fragrant sandal-paste was rubbed on the forehead, and bouquets of flowers were placed in rooms.

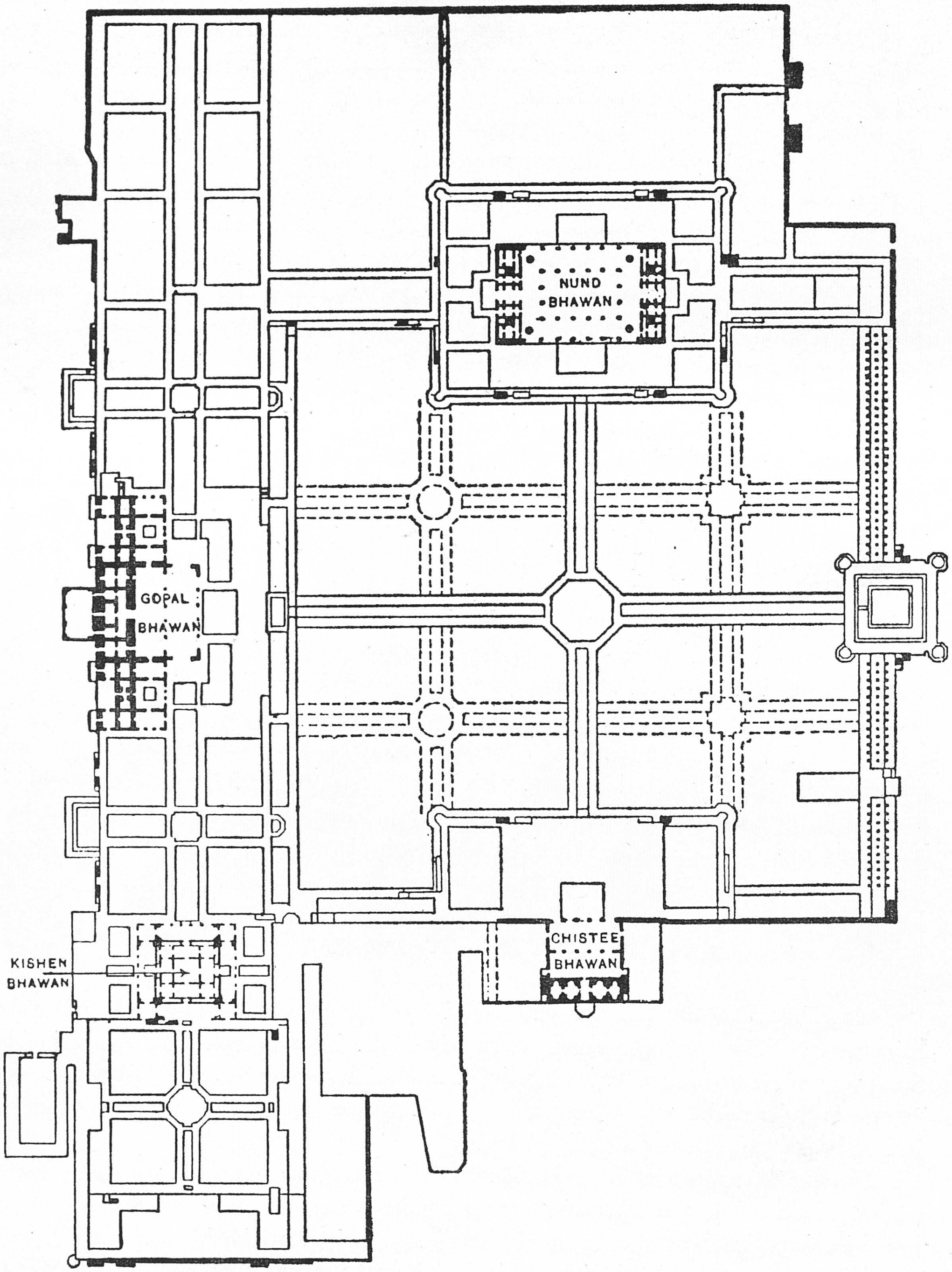
Two-thousand-years ago, our ancestors led a joyous life. Vatsayana in his well-known book *Kamasutra*, the great book of Hindu aesthetics written about 300-400 A.D., describes how they enjoyed civic life. The book has a happy materialistic outlook with none of the other-worldly pessimism. Lovers preferred the canopy of the open sky in the night for their revels and selected shady corners in gardens as love-nests during daytime. The woman made a bed of leaves in a secluded nook, and covered it with a carpet of flowers, thus preparing the 'Couch of Love'. Jaya Dev in his *Geet Govinda* wrote ecstatically about the divine bliss enjoyed by Radha and Krishna on a carpet of flowers in the shade of trees.

In those days danseuses like Vasantasena were held in high esteem, and courtesans and demimondes of Pataliputra, Kosambi, Taxila and Vaisali enjoyed considerable patronage from the ruling classes. Some of them kept wine shops in gardens and doled out Sura liquor to their admirers from the windows of their garden shops which were decorated with flowers. In one of the windows would sit a beautiful girl playing a *veena* and singing a passionate song in a melodious voice, harmonising with the vibrations of the *veena* strings.

FOUR TYPES OF GARDENS

Four kinds of gardens are described by Vatsyayana: Pramadodyan for the enjoyment of kings and queens; Udyan, where the kings passed their time playing chess with their courtiers, enjoying the dance of danseuses and the jokes of court jesters; Vrikshavatika, where the ministers and courtiers made merry with courtesans and Nandanvan, dedicated to Lord Indra.

Vatsayana recommends the building of a house close to a pond with an Udyan garden outside. Lilies and lotuses were grown in the pond. Geese, ducks and swans were also kept in these ponds. In the garden attached to the house, a swing was invariably set up from the thick branches of shady *neem* or a *pipal*, and in the stifling monsoon weather when there is oppressive heat before the coming of rains and



PLAN OF THE GARDEN-PALACE OF DEEG

there is not a breath of air, these swings were especially popular. The dry and hot months of May and June were spent in darkened rooms inside houses, and in *Asadha* and *Bhadra* (July to September) during the rains, the people mostly lived, worked and enjoyed life under the shade of trees.

The gardens were kept alive with parrots, *mynas*, and *chikors* swinging in cages from the branches of trees. The mango groves echoed the pleasing notes of the *koel* warbling 'Too-o, Too-o' from morning to evening and the shrill cries of peacocks which displayed their gorgeous iridescent feathers in a fan-shaped array. *Papeehas* kept shouting 'Pi-Kahan, Pi-Kahan' from sunset to early dawn, awakening sympathetic responses in the hearts of the love-sick swains playing on flutes, wandering in the forests in search of their sweethearts.

People mostly lived in the open, except for a few months when the hot winds blew, or in winter when it was cold at night. This outdoor life was responsible for the neglect of the house, which was used more as a store-house than a dwelling place decorated with pictures and beautiful furniture. This explains the drabness of the interior of an Indian home, which is richly ornamented outside with a colourful and glittering facade, while the interior is often dismal and gloomy.

SACRED TREES

This is the story of the Hindu-Buddhist garden reconstructed from classical Sanskrit literature, and sculpture. The Buddhist temple garden forgotten in the land of its birth still survives in Thailand. The pagodas of Bangkok which are a living reminder of the ancient Buddhist temples of India are located in peaceful gardens which are enlivened by charming *asoka* trees. In the gardens of the sadhus, we invariably find orange patches of marigolds and cosmeas framed by clumps of green and yellow bamboos. These groves, unfortunately, are in an incredibly shabby state these days. Flowers are essential for the Hindus in their morning worship. They must, however, be grown in the devotees' own garden, for, there is no merit in offering flowers grown in the garden of another person. This practice encouraged the growing of flowering trees like *champaka* and *kadamba* in the precincts of the temples. The custom of use of flowers in worship was borrowed by the Chinese and Japanese from India. Most of the flowering trees which grow in India were sanctified by the Aryans. The *kadamba* is associated with Sri Krishna, and the *asoka* is dedicated to Kama Deva, the god of love. The scarlet flowers of the *dhak* trees, the Flame of the Forest, are sacred to the Buddha, and the red cup-like flowers of the silk-cotton tree are sacred to Shiva. The white flowers of *kachnar* are sacred to Lakshmi, the goddess of wealth and good fortune, and blue lotus is the symbol of Vishnu, her consort. Amaranth is sacred to Kali. The golden-flowered *amaltas*

indicates prosperity in trade and is a favourite of traders and merchants. Even now some of these trees are grown near temples by hermits who usually choose for their huts beautiful sheltered sites on the high banks of rivers. Such hermitages are found along the banks of the Ganges and other sacred rivers near ferries, and are sometime relics of ancient Hindu gardens. Sometimes we find rare trees in these groves of hermits. Mrs. Villiers Stuart discovered such a grove near Khandala, called 'Lanoli Grove' on the railway line between Poona and Bombay, a relic of an ancient Buddhist shrine and a white variety of *Erythrina indica* was discovered from here.

SEASONAL FESTIVALS

India enjoyed a long spell of peace under the benevolent rule of the Guptas and other Hindu dynasties. People led a comparatively happy life and celebrated seasonal festivals with great merriment. The *Salabhanjika* (Woman and Tree) festival was celebrated with great zeal in the ancient city of Sravasti, which flourished in the present-day district of Gonda, and *sal* tree in full blossom was worshipped for offspring.

The merriest festival in ancient India was *Suvasantaka*, the spring festival. *Suvasantaka* survives in the form of *Vasant Panchami* which usually falls in the first week of February when the *sarson* flowers. Women wear yellow saris and men don saffron turbans glorifying the yellow colour of the *sarson* flowers. Young women carry new-grown corn as offering to the goddess of spring, and set afloat myriads of lighted earthen lamps in the sacred waters of the Ganges and the Jamuna. This ceremony of *Deep Dan*, the offering of lamps, is very picturesque: a pitch-dark night, dark figures of devotees in a boat silhouetted against the spires of temples, and a meandering procession of lights on the surface of the water gently swayed by the current of the river following the bends of the main-stream, gracefully floating down and vanishing in the horizon. The flickering points of light are thrown into varying geometrical patterns. Some burn fiercely, others glow gently, but all are ultimately swallowed by the angry waves of the river. How symbolic of the lives of individuals is the *Deep Dan* !

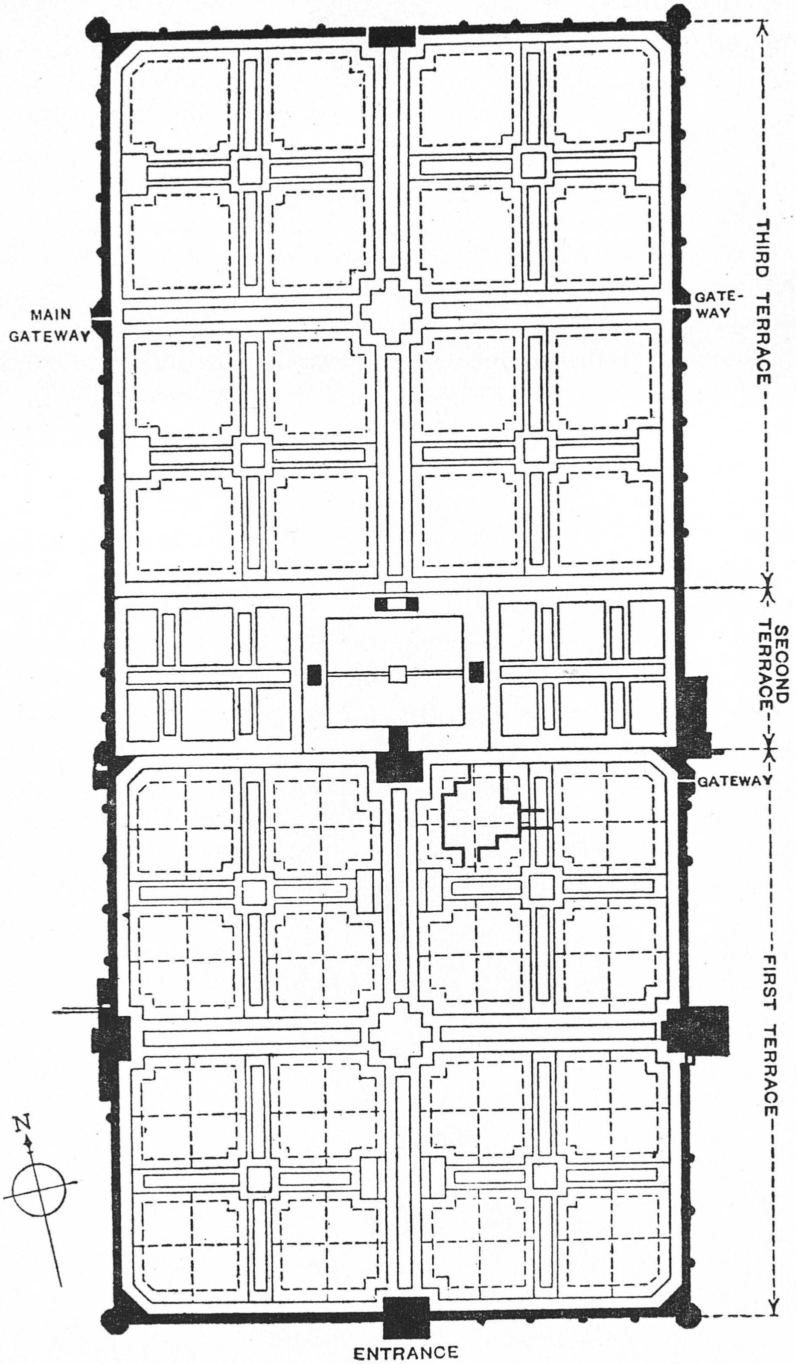
In Kashmir, festivals of flowers, such as the Festival of Roses and the Lilac Viewing Festival are still observed. Large crowds of people in boats of all kinds come out to view the mauve flowers of the lilac bushes along the sides of the Dal Lake. When the bright tulips and white and yellow narcissus flowers fade out, people go to the Shalimar Gardens to see the roses in their full glory.

Some people, particularly foreigners who are compelled to live in this country, often wonder if there is a spring season in India. They are only conscious of the abnormal heat of the summer months of May and June when the vegetation is

scorched by hot winds, the earth looks parched and the sky is one flaming sheet of copper. Yet in India we have a spring season and a delightful spring too. It is heralded by the yellow flowers of *sarson*, which wave like a sea of gold in the first week of February. Out of our flowering trees the *kachnars* are the harbingers of spring. In the third week of February their dark leafless branches produce a harvest of pink, white, and purple-mauve flowers. A mixed avenue of pink, purple, white and light-magenta bauhinias is a lovely sight. The delicacy of their tints and their mass flowering in a leafless condition produces a display of delicate hues, soothing to the eyes and fills one's heart with bliss. Bauhinias are followed by *semal*, the silk-cotton tree. The leafless branches of this graceful tree get covered with cup-like scarlet flowers which look like crimson tropical parrots. A chattering crowd of *mynas* and crows assembles around the flowers, greedily devouring their petals.

About the middle of March most of our flowering trees blossom and the Indian spring is at its height. About the same time, when the *dhak* is ablaze with orange scarlet blossoms, the colourful *Holi* festival is celebrated. There is warmth in the air, and one feels relaxed and happy. Singing and merry-making is organized in all towns and villages. All restraint is thrown to the winds, people sing erotic songs and coloured water made by soaking the flowers of *palash* and *kumkum* in water is thrown on each other. Lovers smear each other's faces with red vegetable dyes mixed with powdered mica, affording opportunities for tactile sensations taboo on other days.

By the first week of April, new leaves appear in our trees and the *pakur* wears a mantle of charming coppery leaves. Jacarandas are producing panicles of blue-mauve flowers and *gulmohurs* are flushing into vivid scarlet. It is getting warm, and the Indian spring has ripened into summer.



PLAN OF THE SHALIMAR BAGH, LAHORE

Chapter VII

THE PERSIAN AND MOGHUL GARDENS

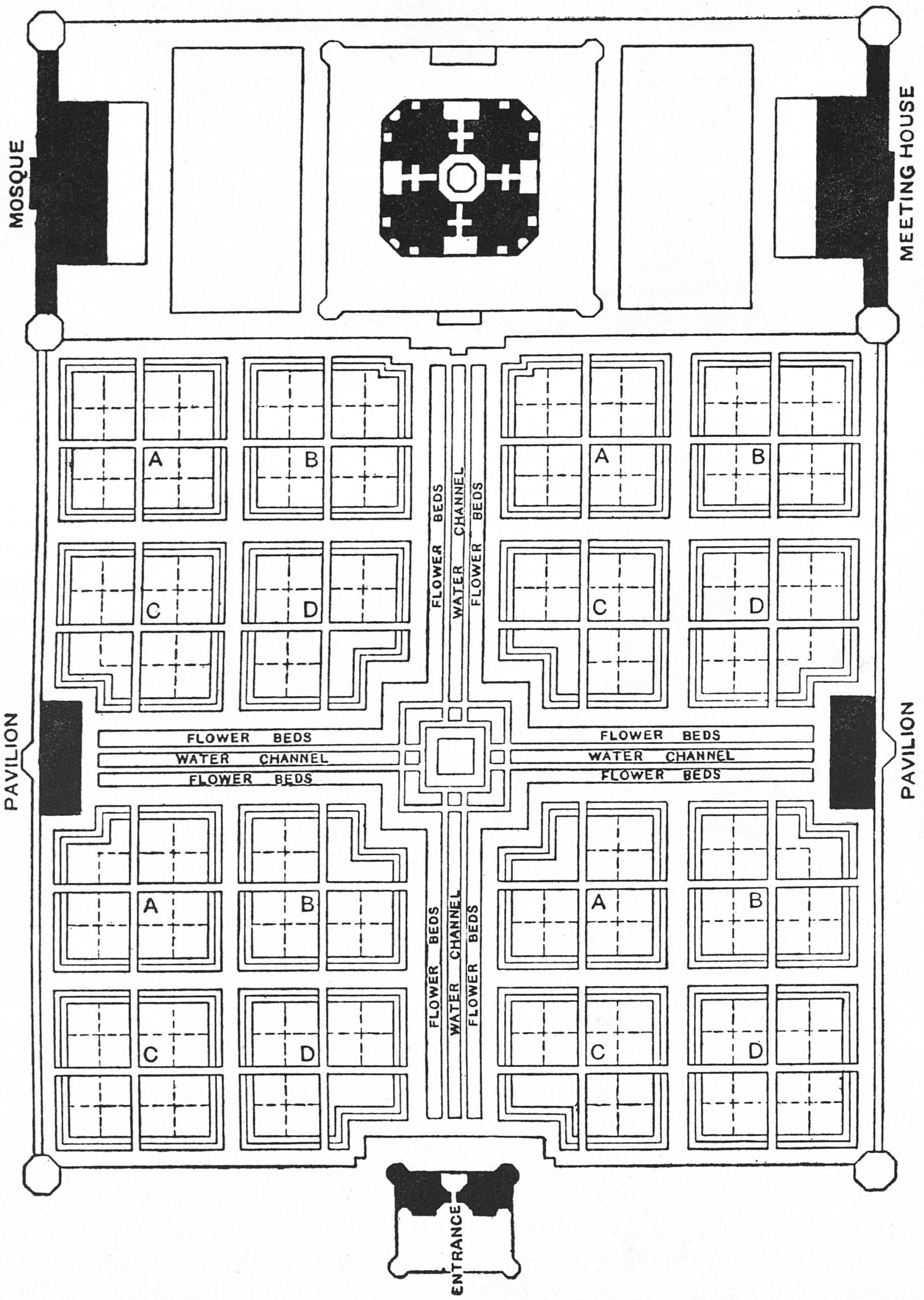
THE inhabitants of Iran and Central Asia have an intense love for flowers. The most popular themes of Persian poetry are the love of the *bulbul* for the rose, and the beauty of the spring. In the highlands of Turkestan and northern Iran, the spring is intensely colourful. After the winter snow melts in early March, the valleys get carpeted with flowers, and the pink blossoms of almonds and apricots and the silvery sprays of plums produce a scene of joyous splendour. Then hot winds follow and scorch the vegetation. Though the spring is all too brief, it leaves an indelible impression on the minds of the people who console themselves for the rest of the year by composing and reciting poems in praise of the rose, the tulip and the narcissus. The transitory nature of the Persian spring has affected the outlook of the Iranian people in respect of life and the universe, and encouraged that strange mixture of hedonism and pessimism with which the western world became familiar through Fitzgerald's translation of Omar Khayyam. It is thus that Omar Khayyam describes the ephemeral glory of the Persian spring, and the transient nature of life itself:

> "Alas, that spring should vanish with the Rose !
> That Youth's sweet-scented Manuscript should close !
> The Nightingale that in the Branches sang,
> Ah, whence and whither flown again, who knows !

And again—

> "And look—a thousand Blossoms with the day
> Woke—and a thousand scatter'd into Clay;
> And this first Summer Month that brings the Rose
> Shall take Jamshy'd and Kaikobad away."

While they realized the insignificance of man in the immensity of space and the universe, comparing him to a bubble in a vast ocean, they did not preach asceticism and renunciation of the world. Though life is merely a bubble in a vast ocean, they made it an iridescent bubble for they took the advice of Omar seriously when he said: "While you live, drink ! for once dead you never shall return." They enjoyed their leisure in beautiful rose gardens, with running water, sipping grape wine which "clears today of past regrets and future fears." Rose was their favourite flower there as well as thereafter, and Omar expressed a desire to be buried in a spot where



PLAN OF TAJ GARDEN, AGRA

the north wind may scatter rose petals on it. His wish was fulfilled, and when he died in 1123 A.D. he was buried in a sweet garden-side at Naishapore with roses dangling over his tomb. This shows how the people of Iran loved flowers and their beautiful gardens. Saadi, the poet of Shiraz, named his book of verses as *Gulistan and Bostan*, i.e., the "Flower Garden and the Fruit Garden." Only an author who lived among people who admired flowers and gardens would select a name like that for a book which was his life's work.

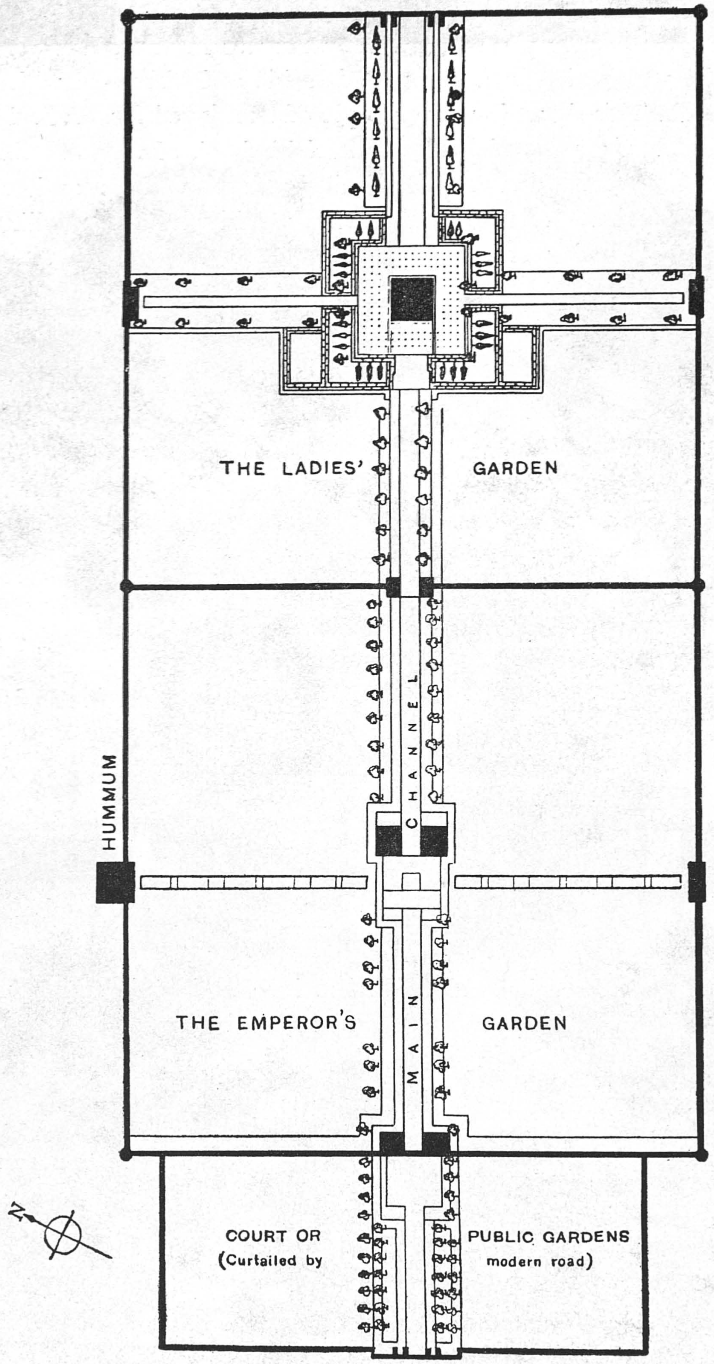
THE PERSIAN GARDENS

The flower garden originated in Iran. Even now love for flowers persists among present-day Persians. Some parts of Iran, particularly in the North are well served by fresh-water streams and rivulets, and people make use of their water for growing trees and flowers. It is rare to find a house without a garden in Iran, and even poor people brighten the compounds of their houses with roses, tulips, and marigolds. Squarish or rectangular shady arbours made of bamboos are commonly seen in the courtyard of houses, and on these are trained creepers like rambling roses, grapes, and petraeas. In these bowers the family assembles for tea and daily gossip, and women spend their time on needle-work and embroidery, and the tedium is punctuated with juicy bits of local scandal. In bigger houses with spacious courtyards a lily pool is commonly constructed in the middle and flowering plants are grown around it. Gold fish are also bred in these pools.

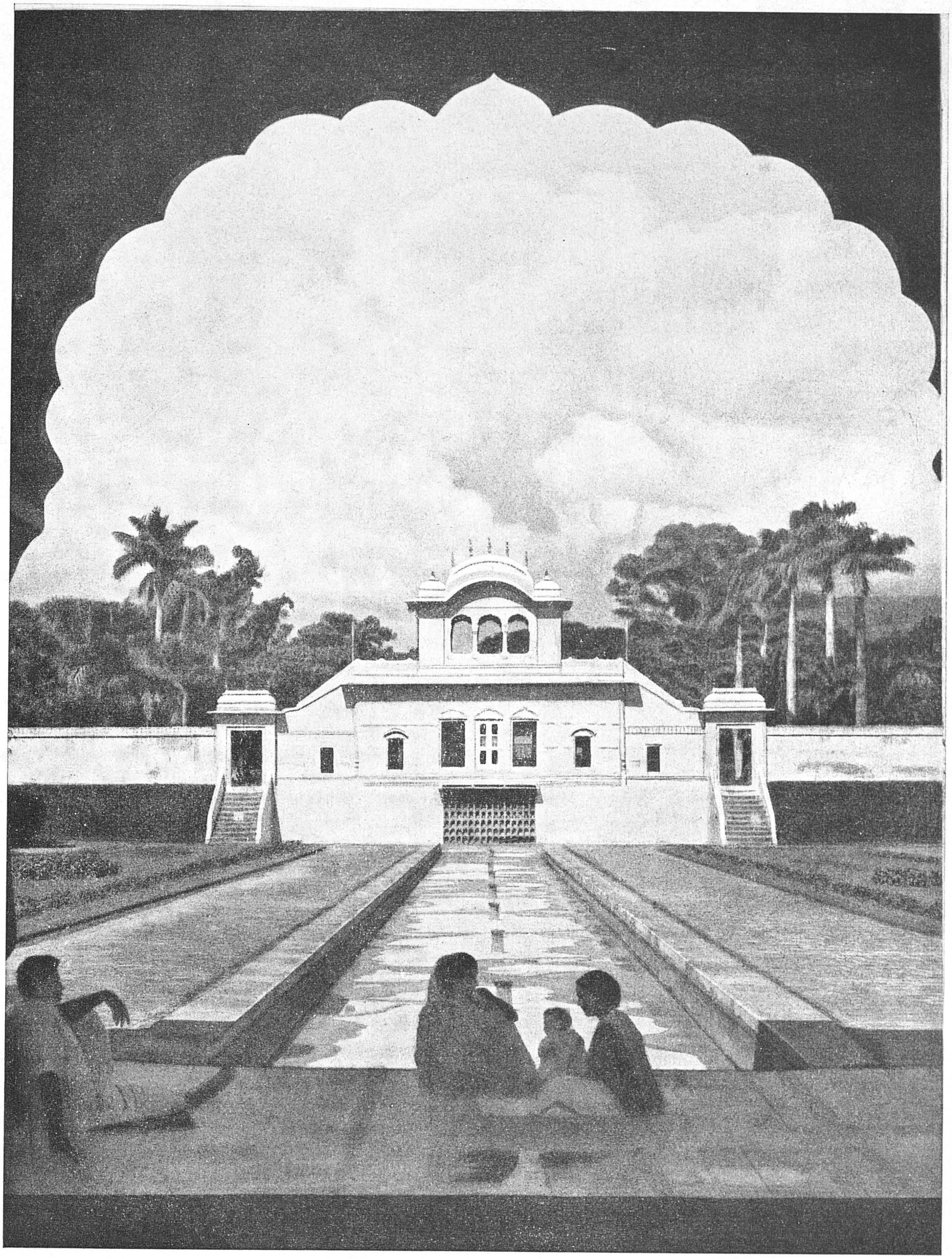
Of all the flowering plants, the rose is the most popular with the Persians and they grow numerous varieties of this shrub. Their other favourites are tulips, marigolds, violets, marvel of Peru, daffodils, poppies and narcissus. At present nearly all the European herbaceous annual flowering plants are grown.

Unlike the Moghul gardens, the Persian gardens have no high boundary walls. Great regard is paid to symmetery in these gardens, and cypress is naturally a favourite. White poplars, plum trees, *udai* (*Acacia planifrons*) and weeping willows are also common. Weeping willows are grown on canal banks. There is a beautiful garden in Meshed, known as 'Maidan-i-Arak' in which the names of famous poets like Saadi, Hafiz, and others are composed out of flowering annuals. Some of the flower-beds are very cleverly and artistically laid out and when in full bloom serve as models for designers of carpets.

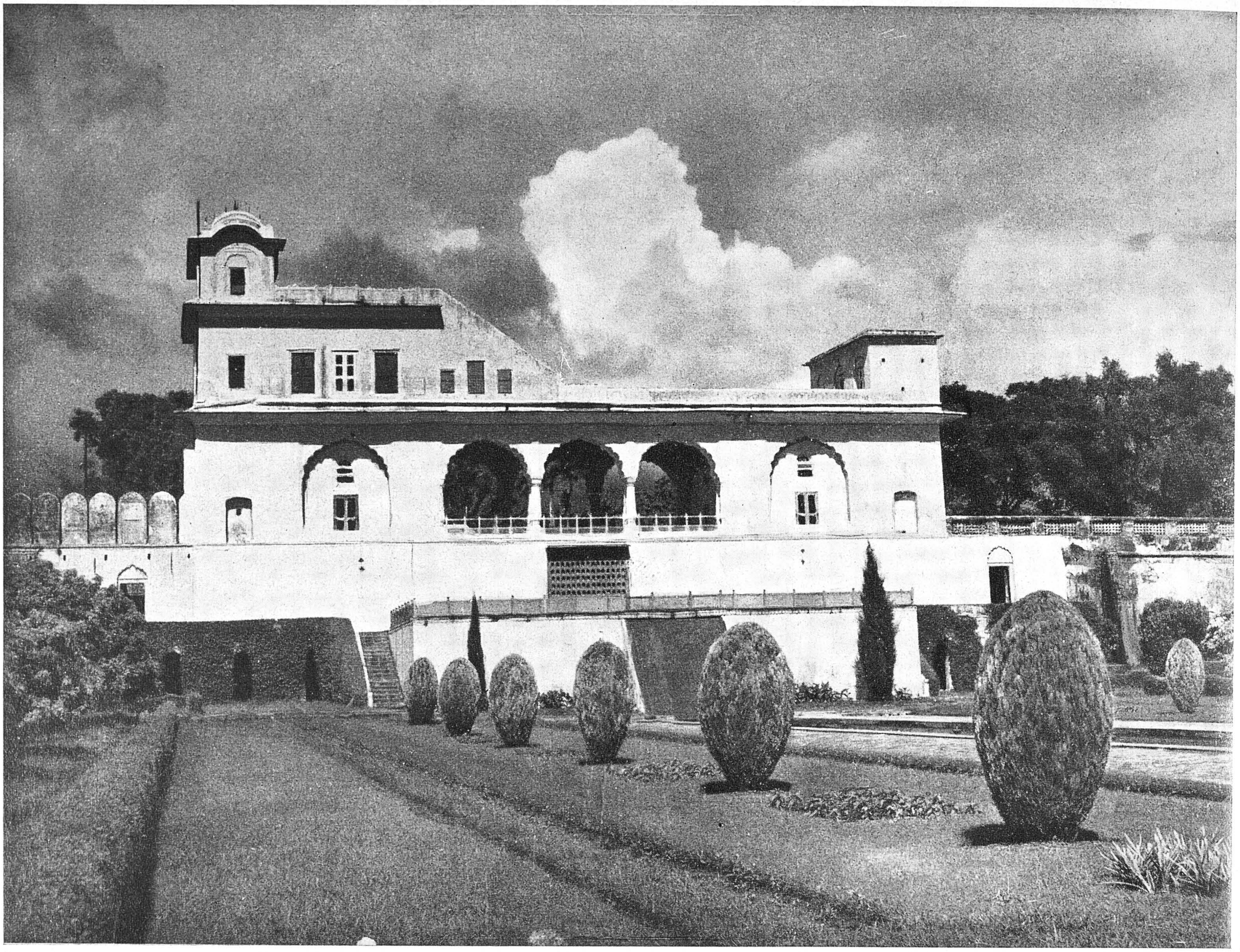
The New Year's Day (Nauroz) in Iran falls generally on 21st of March, when almonds, apples, apricots, plums and pears are blossoming. Crowds of merry-makers collect in the public gardens and orchards to enjoy the sight of blossoms and watch the trees dressed up in white, and pale pink hues. 'Nauroz' in Iran is truly a day of rejoicing and merry-making.



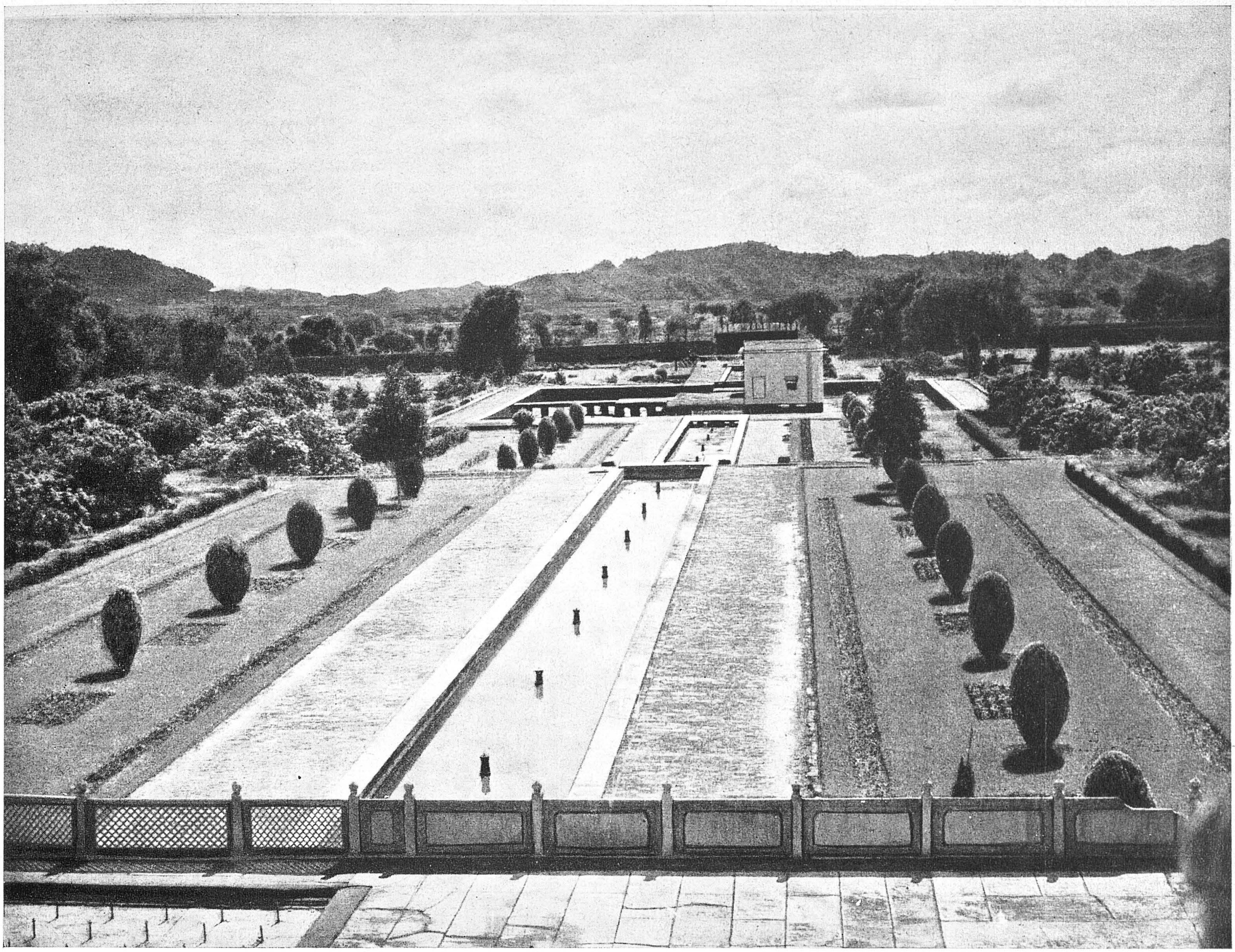
PLAN OF SHALIMAR BAGH, KASHMIR



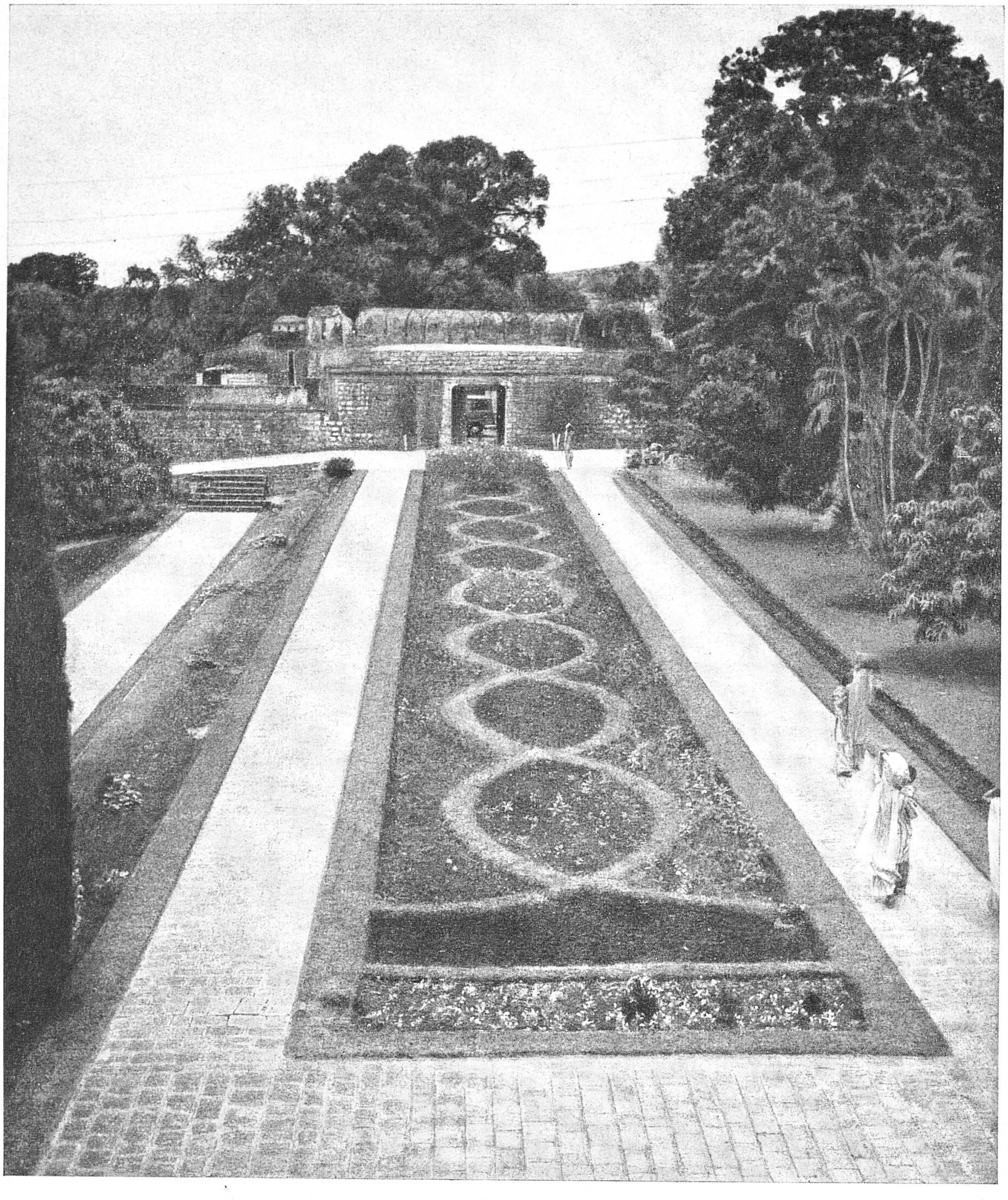
SECOND TERRACE OF PINJOR GARDEN



CYPRESSES IN PINJOR GARDEN



LOWER TERRACE OF PINJOR GARDEN



A FLOWER-BED IN PINJOR GARDEN

THE MOGHUL GARDENS

In India a garden in the sense of enclosed space grown with plants for the sake of the beauty of their flowers is a gift of the Moghuls and their Persian soldiers and courtiers. Babar, the first Moghul emperor, introduced gardening technique of Central Asia and Iran in India. The begums of the Moghul emperors also share with their husbands the honour and glory of creating the famous gardens of Kashmir, the Punjab, Delhi and Agra. Babar's wife, Mahum influenced the creation of 'Bagh-i-wafa' and 'Bagh-i-kalan' and of 'Ram Bagh' on the banks of the Jamuna at Agra. In his memoirs which he named 'Bagh-i-wafa' (the Garden of Fidelity), Babar has given an account of his gardening activities. He describes the gardens of Samarkand and Kabul, and also mentions the new plants he saw in India.

Jahangir, and his Persian wife Nur Jehan, made the gardens at Shahdra (Lahore), Wah and Hassan Abdal. Ali Mardan Khan, one of the nobles of Shah Jahan's court, designed the Shalimar Bagh of Lahore as well as the gardens in the Red Fort of Delhi and the Taj Mahal of Agra. He also introduced in Kashmir the *chenar* tree from Central Asia. The *chenar* has become the national tree of Kashmir and its leaf design can be seen in embroidery, carpets, wood-carving and even in brass-work. Like deodar in Kumaon, *chenar* is a State tree in Kashmir and no one can cut it without the permission of the government. It is on account of this protection that we still see avenues of stately *chenar* trees along the banks of the Jhelum in Srinagar and near Matan on the road to Pahalgam.

Fadai Khan's Garden, Pinjor. The well-known Moghul garden at Pinjor near Kalka, on the hill-road to Simla, was built in the reign of Emperor Aurangzeb by Fadai Khan, a Moghul general. The old name of Pinjor is Panchpura—the town of five Pandava brothers. The tradition is that the Pinjor spring was discovered by the Pandavas, during the period of their exile. After victory over the Kauravas, and many years of empire, the Pandavas renounced the world and proceeded towards the Himalayas. Four of the brothers settled at Pinjor, while Yudhistra, the eldest travelled on towards Mount Meru followed by his faithful dog. After lapse of many centuries, the possibilities of the Pinjor spring were grasped by the garden-loving Moghul, Fadai Khan. The garden is so situated that it embraces wide views of the Kasauli hills and the Siwalik range. The sloping nature of the ground, and the presence of a bubbling perennial stream were possibilities which immediately appealed to the Moghul, who utilized them to his best advantage.

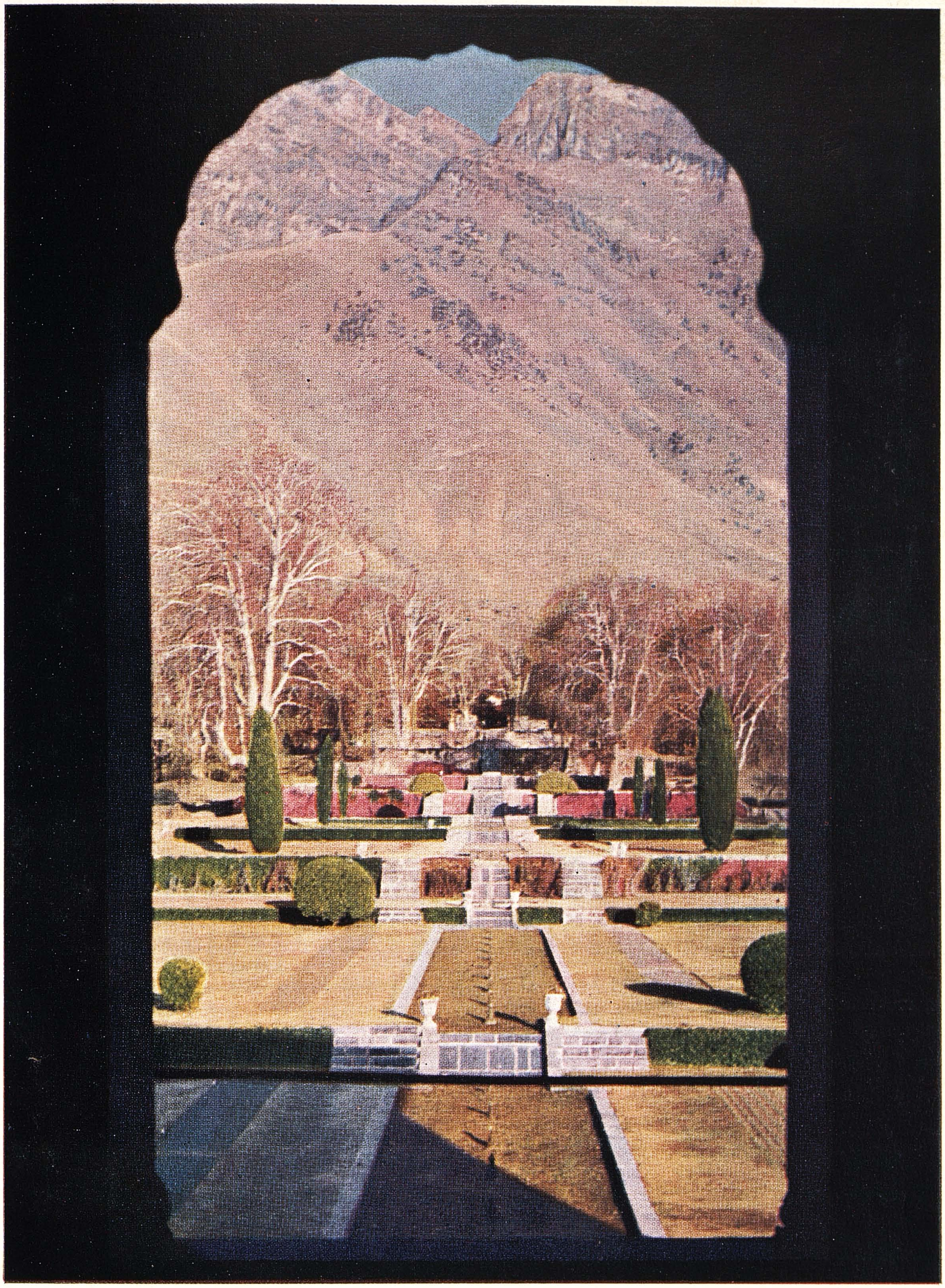
Fadai Khan built his country-house and garden at Pinjor with all haste, but could not enjoy its calm and beauty for long. The hill Raja, in whose territory Pinjor was situated, did not like the idea of a powerful Moghul general settling so close to him. The tract of land stretching from Pinjor to Mani Majra, known as Neli, is notorious for large incidence of cretinism and goitre among its population.

The Raja collected all prize idiots, and goitre-affected women of Neli and sent them as domestic servants to Pinjor garden. When the begums of Fadai Khan saw so many women with swollen throats, they were rather taken aback, and on questioning them were told that, if they continued to stay in that place a few months more, they would also look like them. The begums became scared, terribly scared. On the behests of his terrified begums, Fadai Khan quitted Pinjor, leaving the garden to the Raja of Bhiwana. A Raja of Sirmur acquired it from the Raja of Bhiwana, and ultimately sold it to the Maharaja of Patiala.

As one crosses the Ghagar near Surajpur, the road rises gently and bends sharply. *Dhak* trees laden with crimson flowers and *amaltas* trees covered with yellow bunches enliven the landscape. On the left side of the road, a grim-looking fort-like building with crenellated walls can be seen. This is the Pinjor garden. The white-washed gate is smothered with magenta-coloured bougainvillaeas. Flanking the canal, are stately avenues of the Royal Palm, *Oreodoxa regia,* with their graceful plumes waving gently in the morning breeze. There are six terraces in this garden with a canal running through. At the end of the first terrace is a white building called Shish Mahal, which appears like a huge transparent shell against the dark blue evening sky. Shish Mahal is furnished in simple Indian style, and is used by the Maharaja for his residence when he visits Pinjor.

At the end of the second terrace is a two-storeyed building called the Rang Mahal, flanked by the guest houses of the Maharaja. When water is running in the canal, fine views can be had from the Rang Mahal. The water flowing beneath the Shish Mahal falls over a projecting ledge, below which the wall is painted blue, and is carved into rows of alcoves in which earthen lamps, filled with *sarson* oil are lit and twinkle like fireflies, creating illusion of a fairy land. The fountain throws up jets of water many feet high, which break into fine spray. The lights of Surajpur and Kalka twinkle like stars, and the air is heavy with the fragrance of *Raat-ki-rani.* In summer subtle yellow jasmines intoxicate the senses, and snow-white moghra flowers bloom most sweetly. Borders of phlox, verbena, candy-tuft, and pansies present a colourful pattern, pleasing to the eye. Under the dark mango trees, are soft patches of blue ageratum. A visit to Pinjor in spring, when flowering annuals are at their best, water is flowing over blue cascades, and the fountains are in full play, is an event never to be forgotten. Pinjor is truly the most beautiful garden in northern India.

Moghul Garden Design. Garden architecture is influenced by the climate of the country, and its political, economic, and social environment. A typical Moghul garden is squarish or rectangular in shape. It is surrounded by a high wall adorned with serrated battlements, and there is a stately entrance gate with huge wooden doors studded with heavy iron bosses, nails, and spikes. The garden itself is divided into two or more terraces with a small brick-paved canal with running water flowing



NISHAT GARDEN, KASHMIR

ACHHABAL, KASHMIR

CHASHMASHAHI-3, KASHMIR

KASMIRE.
E.F. SASS BRUNN

down through tanks provided with fountains. A high protecting wall was a necessity in those insecure times in Central Asia, as an enemy or armed brigands might pounce upon the chieftain at any time. Surrounded by his wives and concubines the Moghul chieftain sought peace and shelter in his garden, secure against his enemies, and from the curiosity of peeping Toms. The garden wall also protected the inmates from the hot winds of summer, and the plants from the desiccating effect of burning sand and hot air. Central Asia has undergone gradual desiccation in the last twenty centuries or so. Green valleys slowly became sandy deserts, and vegetation receded into smaller and smaller areas before the onslaught of sand. Man struggled heroically against his enemies, the hot wind and the sand, and one of the devices which he adopted was that of raising high walls to protect the trees and springs of water.

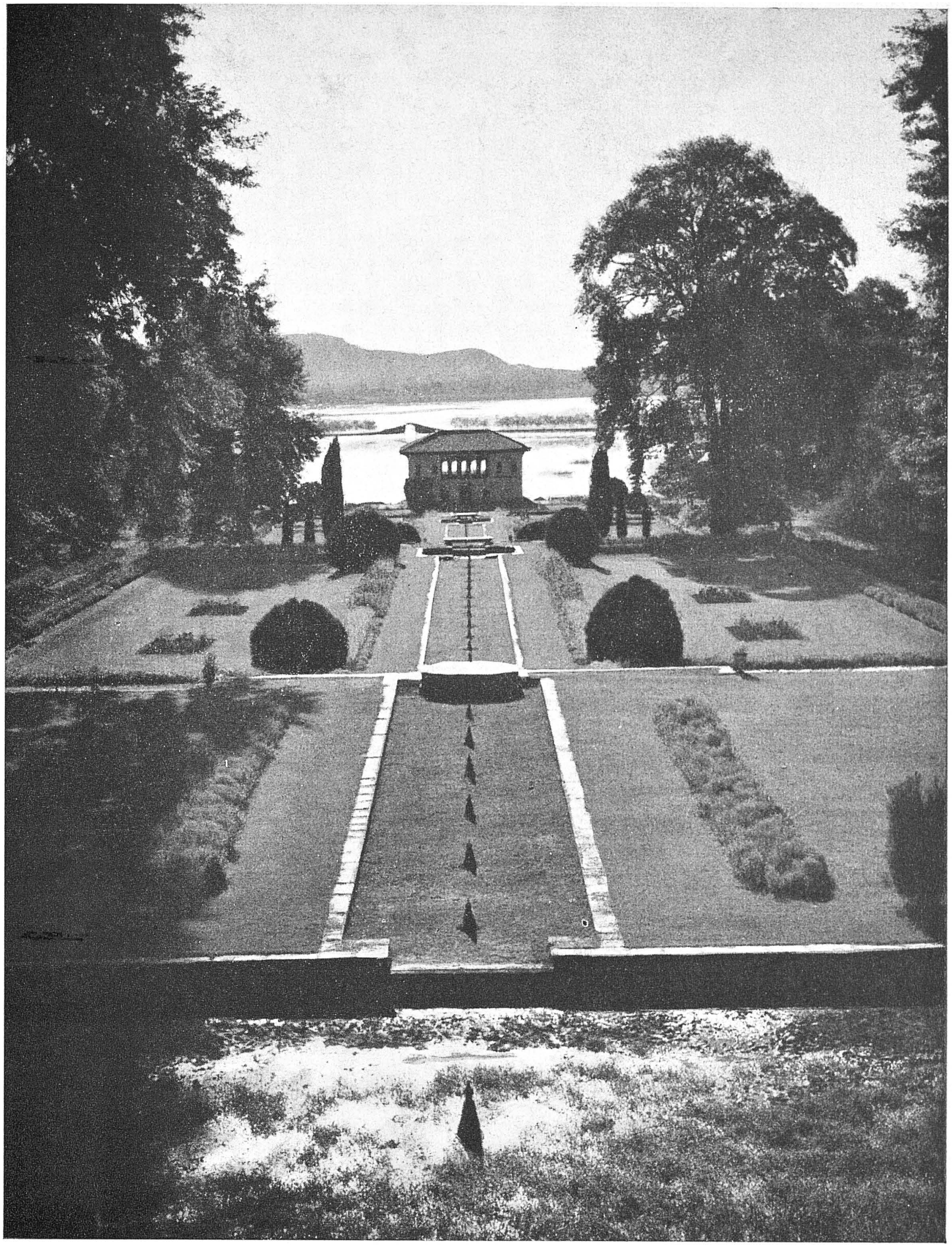
Running Water. The love of a people living in a semi-desert for cool running water can easily be appreciated, so much so that the Arab populated his paradise not only with houris, but also imagined that it is a huge garden-like place with streams of cool crystal-clear water. The idea of heaven as evolved by different peoples living in different zones of the earth, crystallizes their desires and strongly-felt needs. While the sport-loving Red Indian visualized his heaven to be a huge open area, with plenty of horses and deer, the Eskimos' heaven is full of lichens and reindeer. The heaven of the ease-loving Hindus is populated with fairies who sing and dance in Indra's court all the time, and the heaven of the Palestinian Jews and Christians who tended goats and sheep is a pasture land with streams full of milk and honey. No wonder the Arab or the Persian living in a more or less arid desert imagined his paradise to be a huge garden where he would lie languidly on grass with beautiful woman by his side, listening to the music of running water and enjoying its delightful flash and sparkle. Water is the life and soul of a garden. As Mrs. Villiers Stuart observes: "The spirit of the garden paradises of Europe hides in the flowers, the grass, the trees, but the soul of an Eastern garden lies in none of these; it is in the running water which alone makes its beauties possible" On account of their love for running water, the Moghuls selected sites centring round hill-side springs for their beautiful gardens in Kashmir, like Verinag, Achhabal and Nishat. They borrowed from the Persians, the idea of constructing canals and tanks in such a manner as to keep the water brimming to the level of the paths on either side. Like the Persians they also paved the shallow channels of water with brilliant blue tiles, which give a suggestion of depth, and reflect the blue sky in a deep blue tone. From terrace to terrace the water was led down the beautiful slopes called chadars. Mrs. Villiers Stuart who has made detailed observations on Moghul gardens, thus describes these chadars: "These marble or stone chutes were carved in various patterns, cut ingeniously at an angle so that the water running over them was thrown up and broken into ripples and splashes. Shell and wave designs were the favourites, and their name was as prettily fashioned as their carving—they were called

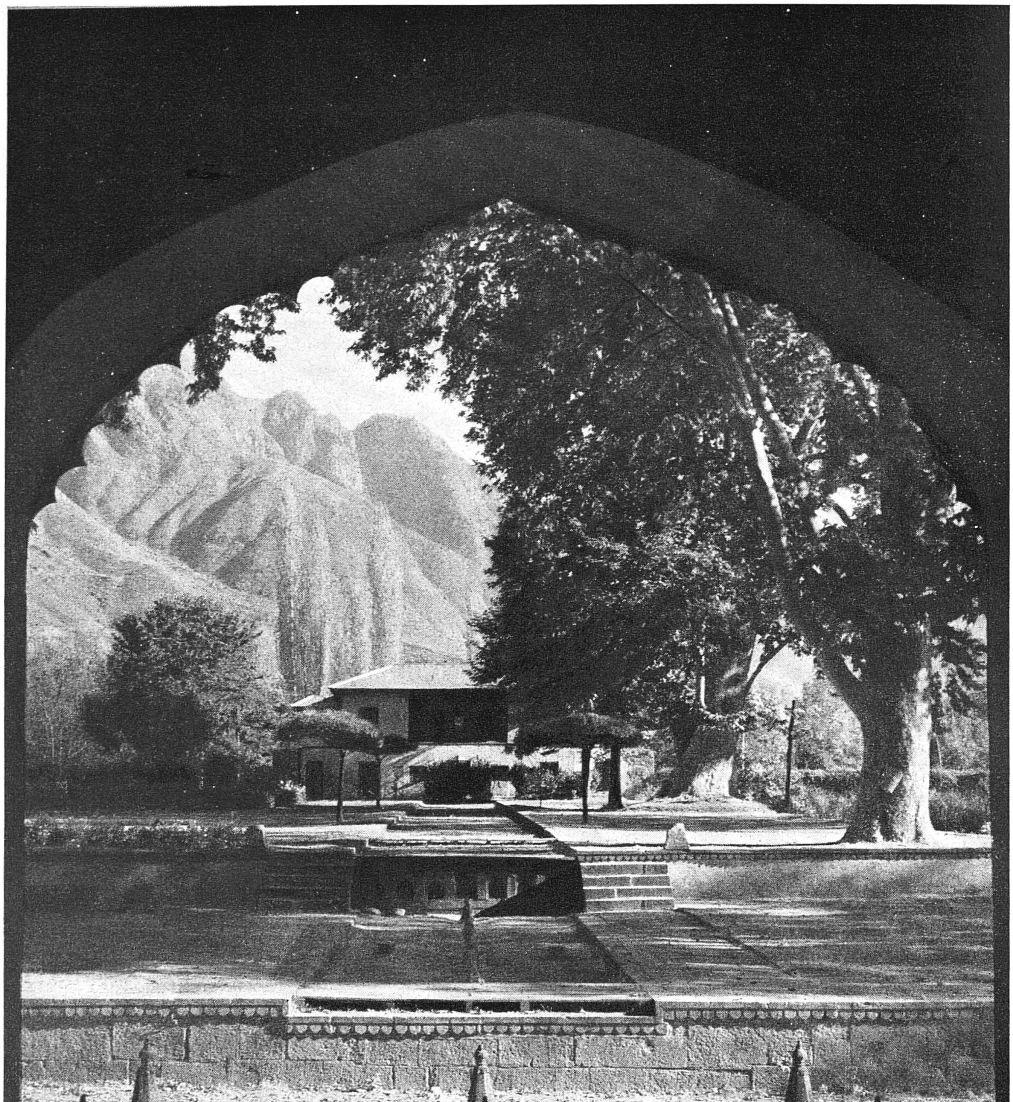
chadars, meaning white shawls of water. These water-chutes are a very characteristic feature of the Moghul gardens, and were used with much effect where the ground allowed of the garden being laid out in a series of high terraces. But, in small gardens or in the plains, even the slightest slope was made use of; only a foot or two of difference sufficed to create one of these charming little water-falls, whose inspiration was directly drawn from memories of the dancing spray and white foam of mountain rivulets in the builder's northern home."

Terrace and Baradari. The Moghuls made their buildings and gardens in a grand style. Compared with their forts at Agra and Delhi, the castles of feudal Europe appear mean little structures, and placed beside Moghul gardens at Srinagar and Lahore, though they are shorn of their original glory and beauty, the Tudor gardens of Hampton Court Palace appear tawdry. There is more than mere national pride in the remarks of an Indian visitor, who comparing the Moghul and English gardening said to Mrs. Villiers Stuart: "You English people can grow plants and flowers to perfection and many that we never knew to exist before. But why can't you design a garden to grow them in? Look at the gardens that our kings and princes made before you came." The Moghuls concentrated their attention on garden architecture and produced beautiful designs, while the English paid more attention to plants, and by scientific study of their growth and mode of reproduction evolved many new varieties of flowering annuals. In its own place the contribution of both to world gardening is great. It is thus that men came to build grandly and to garden finely.

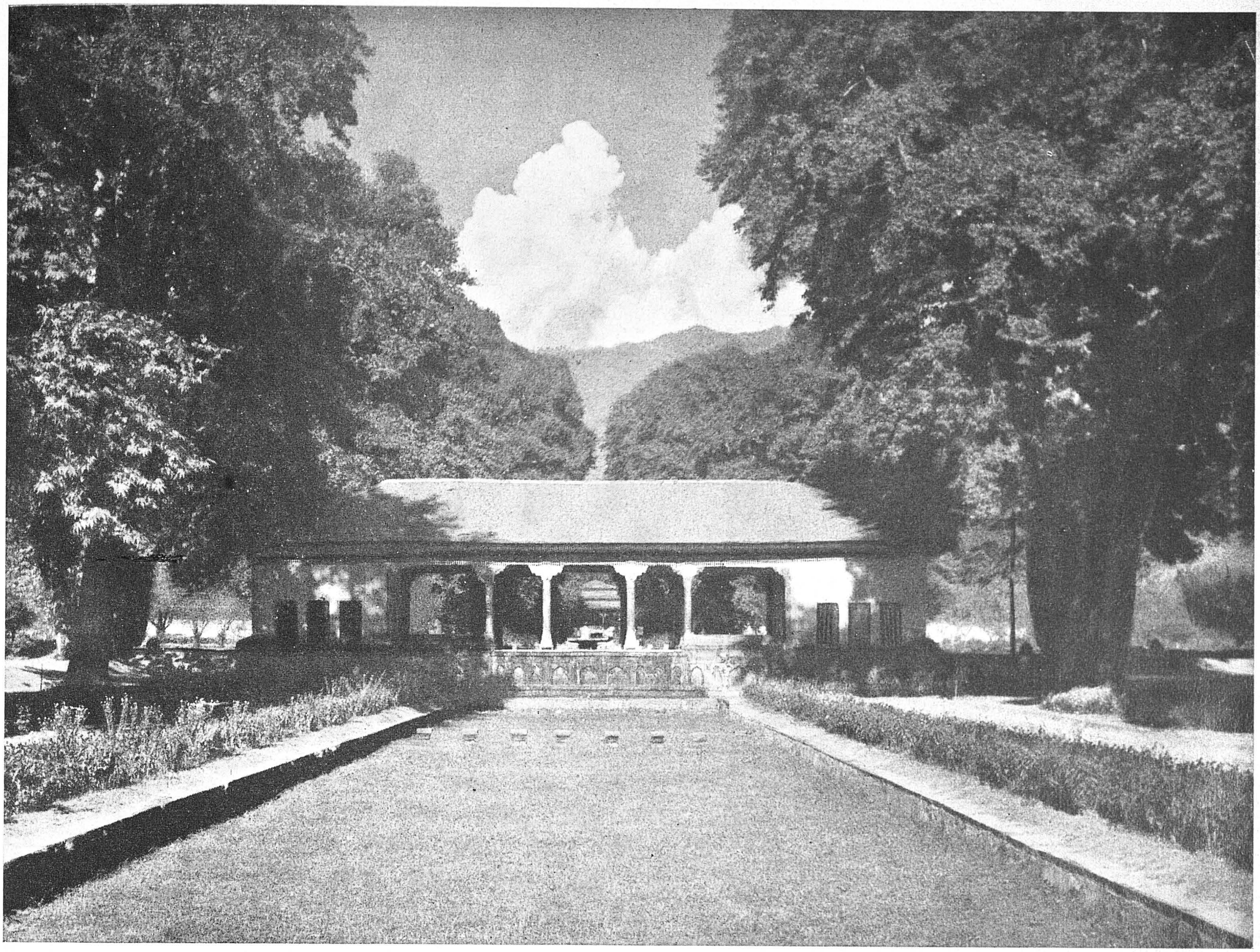
As the Moghuls came from a hilly country, the idea of building a garden in terraces came to them naturally. They were so much enamoured of the terrace garden that they imported it even in the flat plains of the Punjab. Sometimes, there are eight terraces corresponding with the eight divisions of the paradise according to Moslem faith, or seven to symbolize the seven planets. The Taj gardens follow the fourfold field plot plan, the ancient Hindu fourfold paradise of peace and repose. The Nishat Bagh by the side of Dal Lake was built by Asaf Khan, a brother of Nur Mahal. It is built in twelve terraces, one for each sign of the Zodiac, which rise from the bank of the Dal Lake and ascend up the mountain-side.

Baradari, a canopied building with twelve open doors on all sides, often many more, is another feature of some of the Moghul gardens. Baradari is a typically Hindu structure evolved by them to meet the requirements of the rainy season. People sit in baradaris to enjoy fresh breeze, and to watch the black curly clouds and the rain. In Rajput and Moghul paintings we often see princesses surrounded by slave-girls watching the flights of white egrets, with their snow-white feathers contrasting with slate-blue clouds in the background. In the cold temperate climate of northern Europe, particularly in England where rain is usual and sunshine is rare, people cannot imagine the joy and pleasure which the first monsoon showers

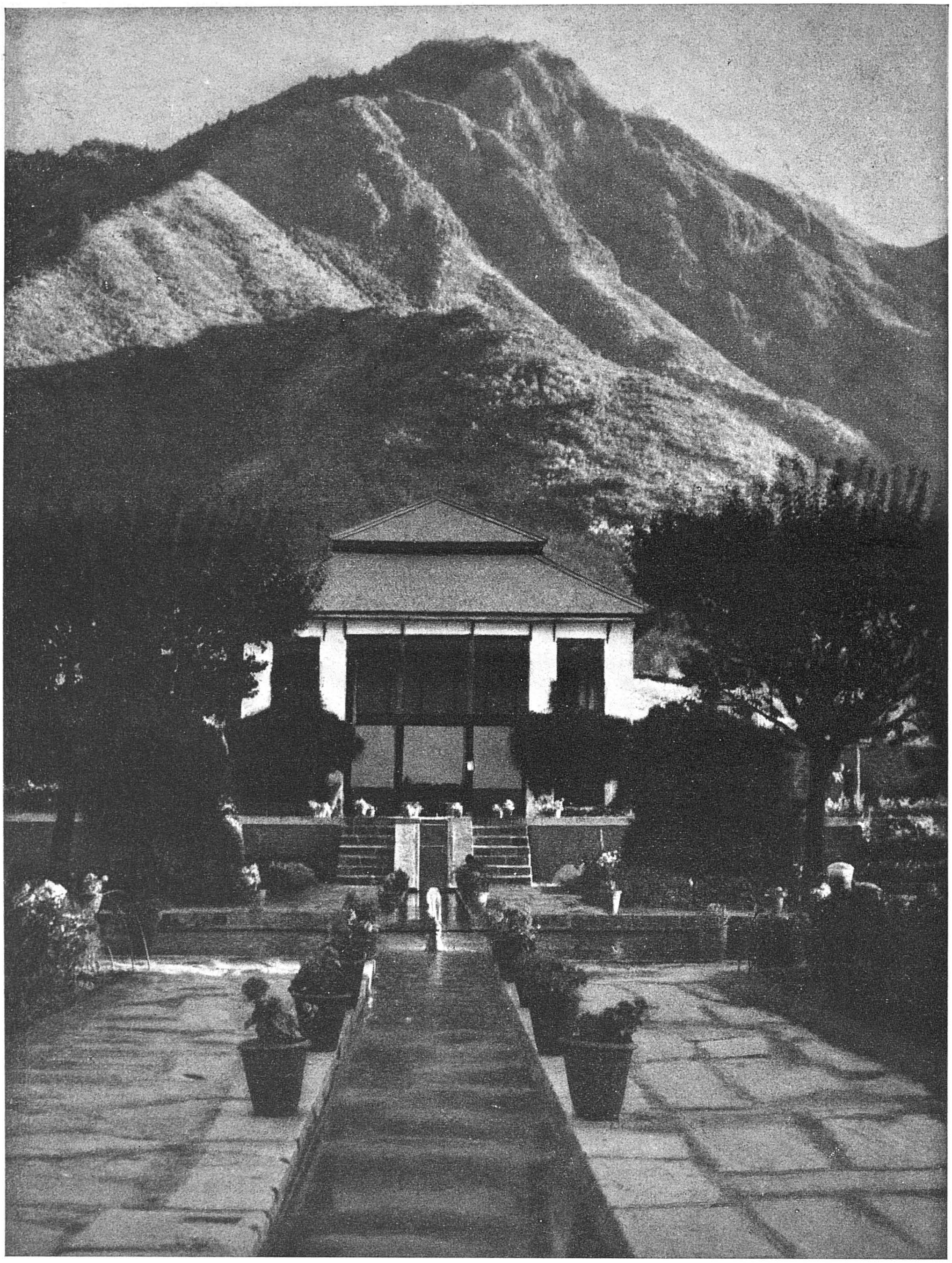




A VIEW OF SHALIMAR GARDEN FROM THE GATE, SRINAGAR



A PAVILION IN THE SHALIMAR GARDEN, KASHMIR



bring to the young and the old alike in the parched plains of northern India where the hot sun of June scorches all vegetation. To them, these Indian pictures appear funny, as they cannot imagine that any one can be so balmy as to like rain and clouds, which they always associate with bad weather. Indians love the monsoon rains and clouds. In their baradaris they listen to the songs of the dancing girls, watch rain and clouds, and suck mangoes cooled in iced water. It is hardly to be wondered that the Moghuls adopted the baradari in their gardens in the plains. They painted the masonry pillars of the baradari with their favourite design of bouquets of flowers in vases, and furnished them with thick carpets and cushions.

The design of the small plots along the canals and tanks was formal, and we usually see octagons or star parterres which were filled with flowers, separated by oblong beds planted with two orange trees on the sides of a cypress tree.

Flowers and Trees. Bricks and mortar by themselves do not make a garden. It is the trees, shrubs and flowering herbs which give life and soul to it. Most of the Moghul gardens are in a neglected state at present; the canal and tanks are choked with blue-green slimy algae and the trees which were originally planted are mostly dead. Those who have experience of gardening know well enough what even a year's neglect can mean to a garden, and what efforts are required to make a garden. So one can imagine the transformation the Moghul gardens have undergone in the last three centuries.

Details of plants grown by the Moghuls are available from the autobiographies left by the Moghul emperors. They planted mixed avenues of cypresses and flowering trees like the white flowered variety of *Bauhinia variegata* or orange and lemon trees. In Kashmir, plum or apple trees were grown in place of oranges and *kachnar*. Bordering the square plots were pomegranates and oranges. Oranges, pomegranates, almonds, plums and white *kachnars* are the symbols of youth and life, while cypresses symbolize death and eternity. The dark-green cypresses, the emblem of death and eternity provided a solemn background to the silvery sprays of plums and pink blossoms of almonds, the emblem of youth, life and hope. Thus, we see life and hope jostling with death and eternity, reminding one of life force, ever renewing itself and ever rejuvenating by reproducing young life and lopping off the cankered, the aged and the decaying.

The mysticism of the Orient finds expression even in the garden-craft. In Japanese gardening, Wisteria is likened to a woman, frail, drooping sweet-scented, robed in delicate pale hues, clinging helplessly to her lord and master, the pine, which is a symbol of long life, sturdiness, strength and steadfastness. The white plum blossom is symbolic of spiritual strength and beauty, while the pink cherry blossom signifies bodily or sensuous beauty. In Islamic garden-craft, too, we find rich symbolism in the planting of trees, and flowering herbs. Describing the symbolism of Moghul garden-craft, Mrs. Villiers Stuart writes, "The Moslem garden-craft, like

Moghul painting, is full of symbolism, and rich with all the sensuous charm and dreaminess of the old Persian tales; and the story of Laila and Majnu, the faithful lovers who only saw each other twice on earth, is most frequently commemorated in the garden. Two low-growing fruit trees, such as lemon and citron, or a lemon and orange tree, planted in the midst of a parterre of flowers, are the lovers happy in paradise; the same idea is also illustrated by two cypresses of the so-called male and female date palms, which are generally planted in pairs. The design of the double flower-beds in which the two symbolic trees were planted can be seen in the brick parterre at Lahore and in those of the Taj. Majnu's sad, earthly symbol is the weeping willow *(baid-i-majnun)*, whose Laila, the water lily, grows just beyond his reach. Two cypress trees are frequently grown as their emblems, and the prettiest and quaintest emblem of all is Laila in her camel litter, a rose-bush on a little mound. Dark purple violets represent the gloss and perfume of her blue-black hair, saman (jasmine), which also means a foaming stream is Laila's round white throat, 'cypress-slender' is her waist, tulips and roses are her lips and cheeks, and the fringed, starred narcissus her eyes."

The Moghuls mostly planted spring-flowering trees, shrubs and herbs in their gardens. They grew white, purple and mauve iris near lilac bushes, daffodils and narcissi under apple and quince trees and tulips under pear and plum trees in their Kashmir gardens. In summer they grew roses, carnations, jasmines, holly-hocks, peonies, and delphiniums. Sometimes flowers of one variety were massed in a garden thus creating beautiful colour effect.

CHAPTER VIII

THE ENGLISH GARDEN

THE English flower-garden is the most beautiful of all European gardens. The typical grassland climate with showers of rain at frequent intervals so favourable for the growth of herbaceous vegetation, the wealth of the country and the love of the people for flowers, are factors which have contributed to the evolution of the English garden to its present high level of development. The average Englishman is an ardent lover of flowers, and an English-woman receives a present of cut-flowers with real joy, which she freely expresses in charming encomiums of "How lovely !" That is why florists' shops are so popular in England. It is estimated that about 15 million pounds sterling a year are spent in England on cut-flowers, and over a hundred thousand people are employed in the industry. Carnations, sweet peas and roses are very popular. The palings and fences of houses are invariably covered with rambling roses of numerous varieties, and they are a beautiful sight in the month of March.

The pleasure-garden was originally a gift from the East to the West which the West has brought back to the East in the highly developed form of the herbaceous annual border. It was in the hot countries of Western Asia that the grouping of flowering plants irrigated by canals and wells which we call a garden, came into existence. We hear of the so-called 'Hanging Gardens of Babylon' which were, in fact, terrace gardens made on mounds. Solomon's garden had shady avenues, vine arbours, groves of pomegranates, pergolas and vast pools of water. It also contained a menagerie of apes and peacocks. It was full of sweet-smelling plants like spikenard, camphire, saffron, calamus, cinnamon, myrrh and aloes. "Awake, O north wind; and come thou south; blow upon my garden, that the spices thereof may flow out." The Song of Songs has been called a lyric of the scented garden, and is full of references to fragrant plants, the most poetic being to the exquisite scent of the newly-opened blossoms of grape-vine. The pleasure-garden originated in Iran and Central Asia when these countries were in a comparatively advanced state of civilization. Shady trees and cool water are prime necessities in a hot country. The Persians made pleasure-gardens with shady walks, and planted roses along pools of water to add fragrance to the air. The Greeks copied the pleasure-gardens of the Persians, and the Romans borrowed the garden idea from the Greeks.

The history of the English garden is closely connected with the history of gardening in Europe which may be traced like most of their other arts to the Greeks and Romans. The art of gardening is said to have been introduced into Athens about 300 B.C. by Epicurus, the pleasure-loving philosopher who used to give dis-

courses to his pupils in his little garden. The Romans who were well-known gourmands lined their 'Digestion walks' with topiary hedges and dwarf trees, and also made fountains in their gardens. With the fall of the Roman Empire, the art of gardening also decayed in Europe.

In the Dark Ages prior to the tenth century, Europe was dotted with gloomy castles and dismal monasteries. The monks made kitchen-gardens for supplying vegetables to the inmates of monasteries and developed herb-gardens for medicinal purposes. The herb-garden of the monks apart from other medicinal plants, also contained roses, hollyhocks, carnations, peonies, violets and lilies. These purely utilitarian gardens ultimately developed into flower-gardens and botanical gardens. In the fourteenth century, the monks introduced gardening craft in England. With the accumulation of wealth in the sixteenth and seventeenth centuries, on account of trade with countries in Asia, Africa, and America, the need for pleasant ways of spending leisure was felt among the moneyed classes in Europe. It was thus that the utilitarian fruit and vegetable garden of the monastery developed into the flower-garden of the aristocracy.

Among the old-fashioned flowers, rose was as popular in medieval Europe, as it is now. It is said that at Worms, on the Rhine, Kriemhild, the Burgundian princess had a rose garden guarded by twelve brave knights ever ready to try their skill against an equal number of warriors, the prize of the victor being a rose garland and a kiss from the lips of the princess who owned the bower.

The Elizabethan garden contained fragrant herbs like the thyme, rosemary, lavender, gillyflowers and lilies. Apart from the beauty and fragrance of flowers, it also had singing birds in cages hung on the trees. A number of gardening plants were introduced in the Elizabethan period by soldiers, sea-captains and merchants who sent seeds and plants from foreign countries to their friends at home. Elizabethan gardens were decorated with fountains, sun-dials, wooden figures of animals like lions, wolves, greyhounds and leopards. Topiary became very popular and images were cut in juniper as well as in yew, rosemary and privet. The Elizabethan garden was pre-eminently a scented garden with a large variety of fragrant plants.

It was only in the beginning of the 18th century that a number of flowering annuals were introduced in the English garden. A 17th century English garden contained very few flowering annuals indeed, and these could hardly be distinguished from plants growing in the fields and meadows. As Maeterlinck says: "Alone, the Violet, the Daisy, the Lily of the Valley, the Marigold, the Poppy, a few Crocuses, a few Irises, a few Colchicums, the Foxglove, the Valerian, the Larkspur, the Cornflower, the Wild Pink, the Forget-me-not, the Gilly-flower, the Mallow, the Rose, still almost a Sweetbriar, and the great silver Lily, the spontaneous ornaments of our woods and of our snow-frightened, wind-frightened fields: these alone smiled upon

our forefathers, who, for that matter, were unaware of their poverty. Man had not yet learnt to look around him, to enjoy the life of nature. Then came the Renascence, the great voyages, the discovery and the invasion of the sunlight. All the flowers of the world, the successful efforts, the deep inmost beauties, the joyful thoughts and wishes of the planet rose up to us, borne on a shaft of light, that, in spite of its heavenly wonder, issued from our own earth. Man ventured forth from the cloister, the crypt, the town of brick and stone, the gloomy stronghold in which he had slept. He went down into the garden which became peopled with bees, purple and perfumes; he opened his eyes, astounded like a child escaping from the dreams of the night; and the forest, the plain, the sea and the mountains and, lastly, the birds and the flowers that speak in the name of all, a more human language which he already understood, greeted his awakening."

The tulip was an introduction from Constantinople in the sixteenth century, the Pansy appeared in 1613, the Purple Scabious in 1629, the Yellow Alyssum in 1710, the China Pink in 1713, the China Aster in 1731, the Long-leaved Veronica in 1731, the Chinese Saxifrage in 1771, the Dahlia in 1802, the Scarlet Sage in 1822 and the Flowering Purslane in 1828. Phlox came from Texas in U.S.A. in 1835.

In the middle of the sixteenth century flower-beds, knot-gardens, pleached alleys, topiary work and terraces were introduced in the English garden from the continent. Thus the Tudor garden was evolved, and a typical example can be seen at Hampton Court in the garden of Henry VIII. These gardens relied for their effect on architectural features and were, in fact, projections of the palace in the garden subject to the laws of architecture. In the seventeenth and eighteenth centuries the French architectural garden found its highest expression in the Versailles palace gardens of Louis XIV which were designed by Andre Le Notre, who also designed the famous gardens of St. Cloud, St. Germain and Fontainebleau in France, as well as St. James' Park in London. The gardens of Schonbrunn, Wurzburg, Dresden, Peterhof and Fursternberg at Prague are all of this type. In such gardens, parterres are merely projections of the rooms and galleries of the palace. Later on the parterres became more elaborate consisting of scrolls, and arabesques. A characteristic of these gardens is that the growth of flowers was subordinated to architectural magnificence.

With the increase in maritime trade with foreign countries, and the desire to grow plants of warmer climates like oranges, the hot-house came into being about the close of the seventeenth century, and ultimately developed into glass-houses which now cover acres of land in the suburbs of London. During this period scientific study of plants, their growth, nutrition, pollination and fruiting was made by pioneers like Richard Bradley, Philip Miller and Fairchild.

A reaction to architectural formality set in about the middle of the eighteenth century, and the landscape-garden with slavish imitation of nature came into vogue

under the leadership of Kent, Capability Brown and Repton. Straight walks were replaced by winding paths, clipped hedges by informal groups of trees and basins by streams. Rivulets and waterfalls were so arranged that they could be seen in long sweeping vistas from the windows of the country houses of the dukes and the squires. The famous garden at Luton Hoo covering an area of 648 hectares, was planted by Capability Brown. It has many interesting water features, plantations on the hilltops, and winding hollows diversified with scattered trees. There is a magnificent forest garden, a rock and water garden, a rose garden and woodland garden planted with flowering shrubs like double cherries, rhododendrons and azaleas. Bulbs were planted in the meadows in such a manner that when the sun was in the south, the tree shadows were marked out and the bulbs planted in the shady areas. Many undergrowth plants are grown between the shrubs to keep out the weeds and to add colour.

In the early part of the nineteenth century another reaction set in. People became tired of the landscape-gardens of Capability Brown, and the Victorian garden with formal beds of annual flowers came into being. However, unlike the architectural gardens of Andre Le Notre, the architectural features were subordinated to beds of flowers in the Victorian garden. Botanical explorers like David Douglas, and plant-breeders and gardeners too numerous to mention, introduced many new varieties of flowering plants, and this influx of new plants ultimately broke the formality of the Victorian garden which evolved into the modern English garden with its turf, herbaceous border, shrub garden and rock garden, in which as Cox says, "A garden is now made to fit the plants, not the plants fit the garden."

In the eighteenth century commercial capital developed followed by the development of industrial capital in the early nineteenth century, and profoundly affected the structure of society in England, and the balance of power also shifted. Power passed from the land-owning aristocracy to the merchants, bankers and industrialists, the new capitalist classes. In the Victorian period, the middle class which forms the core of the modern English body-politic developed. Most of the landlords and squires could no longer afford big landscape-gardens and private parks. The ascendancy of the middle classes also affected the art of gardening. The park and the landscape-garden made way for the small modern English garden with its rock garden, shrub garden and herbaceous border. It is in its economic and social context that we can understand the true nature of this change.

The English spring is well-known the world over for its intoxicating beauty. A mere catalogue of names of flowers would be uninteresting. Now let us turn to Maurice Maeterlinck, the poet and biographer of flowers who with inimitable charm thus describes the flowering annuals which adorn the English garden: "Here, innumerous, disordered, many-coloured, tumultuous, drunk with dawns and noons, come the luminous dancing bands of Summer's daughters ! Here is the marigold, who breaks the green of the borders with her brightness. The sunflower, towers like a priest

raising the monstrance over the lesser folk in prayer, and strives to resemble the orb which he adores. The poppy exerts himself to fill with light his cup torn by morning wind. The rough Larkspur, in his peasant's smock, who thinks himself more beautiful than the sky, looks down upon the dwarf convolvuluses, who reproach him spitefully with putting too much blue into the azure of his flowers. The virginia stock, arch and demure in her gown of jaconet, like the little servant-maids of Leyden, seems to wash the borders of the beds with innocence. The mignonette hides herself in her laboratory and silently distils perfumes which give us a foretaste of the air that is breathed on the threshold of paradise. The Peonies, who have drunk their imprudent fill of the sun, burst with enthusiasm and bend forward to meet the coming apoplexy. The scarlet flax traces a blood-stained furrow that guards the walks; and the Portulaca creeping like a moss, studies to cover with mauve amber or pink taffeta the soil that has remained bare at the foot of the tall stalks. The chub-faced dahlia, a little round, a little stupid, carves out of wax his stiff and formal pompons, which will be the ornament of the village holiday. The old, paternal phlox, standing amid the clusters, lavishes the loud laughter of his jolly, easy-going colours. The mallows, like demure misses, feel the pale pink of mantling blushes mount to their corollas at the slightest breath. The nasturtium paints his water-colours, or screams like a parakeet climbing the bars of its cage; and holly-hock flaunts her cockades of a flesh silkier than a maiden's breasts. The snapdragon, and the almost transparent balsam are more timorous and awkward and fearfully press their flowers against their stalks."

Now let us briefly refer to some of the famous English gardens. No account of gardens in England can be regarded as complete without mention of Royal Botanic Garden at Kew. In fact the history of the Kew Garden and the vicissitudes through which it has passed is the history of gardening in England. The foundation of the Kew Garden is attributed to William Turner, a herbalist, who died in 1568. The garden as it exists today was formed by the fusion of two royal properties, the eastern half corresponding to the grounds of the Kew House, and the western half known as Richmond Gardens which were separated by a bridal road called the Love Lane. Richmond Gardens were developed with great care by Queen Caroline who spent a large sum of money on its improvement. It is thus that the Richmond Gardens are described in *London and its Environments* published in 1761:

> "The gardens are extremely fine, and are formed with an agreeable wildness and pleasing irregularity, that cannot fail to charm all who are in love with nature, and afford a much higher and more lasting satisfaction than can possibly arise from the most extensive decorations of art. You pass through fields clothed with grass; through corn fields, and wild ground interspersed with broom and furze, which afford excellent shelter for hares and pheasants, of which there are great abundance. The King took great delight here, and

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made several improvements in the palace, while Her Majesty amused herself at her royal dairy house, Merlin's cave, the Hermitage, and the other improvements which she made in the park and gardens of this delightful mansion."

The Richmond Gardens were laid out by Bridgeman. According to Walpole. "Bridgeman was the most fashionable designer of gardens. He enlarged his plans, disdained to make every division tally to its opposite, and though he still adhered much to straight walks with high dipped hedges, they were only his great lines; the rest he diversified by wilderness, and with loose groves of oak, though still within surrounding hedges. As his reformations gained footing, he ventured farther, and in the Royal Garden at Richmond dared to introduce cultivated fields, and even morsels of a forest appearance."

Lord Capel introduced a number of fruit plants from France. Describing a visit to Kew in 1668, thus writes Evelyn: "From thence we went to Kew to visit Sir Henry Capel's whose orangery and myrtetum are most beautiful, and perfectly well kept. He was contriving very high palisades of reeds, to shade his oranges during the summer, and painting those reeds in oil."

The garden made the greatest progress under the direction of Sir Joseph Banks, who sent plant collectors to different countries. A Pole by the name of Anthony Hove was sent to India in 1787 to collect plants. *Hydrangea hortensis* and *Paeonia montana* were introduced from China and *Fuchsia magellanica* from Chili. It is from Kew that these beautiful garden plants spread to different countries in Europe. Sir Joseph Banks used to retain rare plants at Kew for one year and after they had flowered, they were liberally distributed by him to learned societies and eminent men.

Rhododendron arboreum was introduced from Nepal in 1818 by Dr Wallich. Plant introduction work took place on an ambitious scale mainly due to the patronage of George III. No less than 6,746 rare exotic plants were introduced. From Kew economic plants were introduced in the colonies, and in 1806 a large collection of succulents was sent to Calcutta. Botanical gardens of Europe were also supplied with rare plants from Kew. After the death of George III in 1820 and of his protege Sir Joseph Banks, the garden suffered neglect. It again made much progress from 1841-1865 under the management of Sir William Hooker. In 1841, the Royal Garden was handed over by the Crown to become the National Botanic Garden and Hooker was appointed the Director. In 1882, Miss Marianne North presented her remarkable collection of 850 oil paintings of plants and flowers to the garden. The Tropical Water-lily House was built in 1852 for the display of the giant water-lily *Victoria regia.* The Alpine House erected in 1887 was modelled on a dry Pyrenean Valley, and considerably enlarged later on. Apart from plants of economic value, the garden contains a large collection of Himalayan rhododendrons. The garden

combines science with aesthetics; though the trees and shrubs are planted in their systematic order, the landscape effect has been maintained.

The world-famous garden at Bodnant, North Wales, was planted in 1798 by Lord Aberconway, the then President of the Royal Horticultural Society. Bodnant is famous for its terrace gardens and rich green and soft velvet-like lawns shadowed by ancient trees. In an area of 24 hectares, many varieties of roses, garden lilies, primulas, meconopsis and gentians are grown. There is a large variety of rhododendrons and magnolias. White-flowering eucryphias from China and scarlet embothriums add charm and colour to the garden. Against the background of Snowdon hill, Bodnant with the lily-pools, fine roses, rhododendrons and yews is really a legend of beauty.

Another beautiful garden is Hascombe Court near Godalming with the picturesque background of rolling downs of Surrey. Its famous Daffodil Walk attracts thousands of visitors. The daffodils are followed by dahlias and michaelms daisies. In the months of April and May, numerous alpine plants bloom in its rock garden.

There is another well-known garden known as Nymans Handcross in North Sussex hills, which is famous for its rhododendrons, many flowering shrubs and conifers. This garden has been enriched by famous plant explorers like Kingdon, Ward, Comber, and Forrest who brought many plants from China, Tibet, South America and Tasmania. This garden is particularly known for its hybrid lilies. The famous pergola is covered with purple flowers of *Wisteria multijuga* which has been imported from Japan.

The garden known as Grange in Kent is well-known for its collection of Japanese cherries of which there are 200 distinct species and varieties including many hybrids. Rhododendrons and azaleas form a charming undergrowth below the flowering cherries. This garden looks very attractive in autumn when a large number of trees with coppery and crimson leaves decorate its walks.

Most of these gardens, developed with so much care and at such cost by individuals, now belong to the nation. When they are at their best in spring, they are visited by thousands of men, women, and children who admire the beauty of flowers and foliage with sincere joy. Beautiful English maidens with rosy cheeks and sparkling eyes in colourful summer dresses with floral designs, themselves appear like flowers, and add great colour and charm to the English gardens.

Chapter IX

JAPAN'S GARDENS OF CALM AND PEACE

The Japanese are a warrior race, who are fierce in combat but gentle in the arts of peace. Like most warrior races, they have intense love for Nature and poetry. Their love of Nature is born of the landscape of Japan, with its green cascaded hills, its pine-girt shores, and purity of its silver air. A lush dark-green vegetation clothes the shores of the sea bays, and the trembling bamboos with their feathery leaves stand out from among the pines conspicuously. As you travel from Tokyo to Kyoto, the ancient capital of Japan and the home of gardens, you feel as if you are in the Kangra Valley in the Punjab Hills. To the right is a high mountain range and below it are villages surrounded by paddy fields. Fujiyama or Fujisan, as it is respectfully called, the peak of the White Lotus, the eternal abode of peace, dominates Central Japan by its silent beauty. In the mist, the pine trees with their twisted branches loom like ghosts in the horizon. The volcanic rocks and mountains have a characteristic look. During the planting season the rice fields when they are flooded with water resemble a mosaic of mirrors. The farmers wearing umbrella-like straw hats transplanting paddy give a quaint appearance to the country-side. The slopes of the hills are covered with dwarf mandarin oranges, which add striking beauty to the landscape in the month of December. The houses of the farmers with sloping roofs, often covered with blue tiles harmonise with the landscape, and temple bells vibrate the music of love and repose.

Japanese poetry abounds in the intense adoration of Nature, the worship of great rivers, delight in clouds and lake-mists, the iris and the cherry blossom, and in the flight of wild geese. In it one hears the voice of the ocean, the music of the pattering rain, and the roar of the water-falls. It bears the impress of the South Chinese poets of the Tang period who blended Buddhist ideals with their love of Nature. As Okakura says, "It is through Toenmei and other poets of the South that the purity of the 'dew-dropping' chrysanthemum, the delicate grace of the swaying bamboo, the unconscious fragrance of plum flowers floating on the twilight water, the green serenity of the pine, whispering its silent woes to the wind, and the divine narcissus, hiding its noble soul in deep ravines, or seeking for spring in a glimpse of heaven, become themes of poetic inspiration".[1]

The Japanese are great lovers of plants and flowers. In fact no nation has such love for flowers as the Japanese. Speaking of offering flowers to the Buddha, Empress Komio, the renowned Nara sovereign who ruled Japan in the eighth century in one of her poems says, "If I pluck them, the touch of my hand will defile, therefore

[1]Kakuzo Okakura—*The Ideals of the East*, John Murray, London, 1920, p. 49.

standing in the meadows as they are, I offer these wind-blown flowers to the Buddhas of the past, the present and the future".[2] This simple poem indicates the reverence, the Japanese have for flowers, and it is no wonder that they created gardens of such subtle beauty and charm. If cultural development of a country is judged from its gardens, Japan no doubt occupies a place at the apex of the cultural pyramid.

Strange as it may seem, the Japanese garden, the most beautiful and highly developed of all the present-day informal gardens, in whose praise the Westerners have written so much, has its roots in the Indian soil. India, the mother of thought and centre of the Buddhist Universe, had very close cultural links with China and Japan. From sixth to seventh century A.D., a lively communication was maintained between India and China through the North-Western mountain passes, and travellers, pilgrims and traders carried Indian art and religion to China and Korea.

In 552 A.D. during the Asuka Period, Buddhism was introduced in Japan from Korea. The art of garden-making was also imported from Korea, and early garden designers were Koreans naturalized in Japan. Later on Japan was much influenced by Buddhism in China under the Tang dynasty. The Buddhist saints from India were the torch-bearers of culture and progress, who adventured into Central Asia, China and Korea, carrying the message of the Buddha and also the idea of the temple-garden. Describing the history of gardening in the Far East, Mrs. Villiers Stuart writes, "The Indian Buddhist garden, forgotten in the land of its origin, still survives further East, although so transformed and tinged by the genius of another climate and another people, that the garden history of the plum and cherry trees, the wisteria and the morning glory, the lotus and the Japanese iris, is often misunderstood and overlooked. For all that, the Japanese garden, the most intimate and charming expression of Japanese nationality, came like so many of their arts, from India through China and Korea. And from the early temple-gardens made by the Buddhist monks and pilgrims, the whole beautiful and elaborate system of Japanese garden craft has gradually been built up. The Indian Lotus-bearers reached China both through Turkestan and by the Southern route through Burma and Cambodia, and 'Coal Hill', near Tartar city in Peking, is a relic of the Pleasure Hill idea. The style is supposed to have been introduced into Japan in the sixth century by one, Yohan Loan Han, who constructed great mounds, some of them hundred feet high or more, and brought water in conduits to form lakes and ponds. These hills and rockeries were planted after the Indian fashion with flowering trees and shrubs."[3]

The Buddhist temple-garden flourished in the soil of China and Japan. In the

[2]Kakuzo Okakura—*The Ideals of the East*, John Murray, London, 1920, p. 118.
[3]Mrs. Villiers Stuart,—*Gardens of the Great Mughals*, pp. 236, 237.

moist temperate climate of Japan, so favourable to the growth of vegetation and in the hands of an artistic people, it was transformed into almost a new type of garden, the Japanese landscape garden.

In 794 A.D., the capital of Japan was shifted from Nara to Heian or Kyoto. The first gardens were constructed in Kyoto by the nobles in the form of parks for holding garden parties, music concerts and sports. The gardens of Heian period (794-1185 A.D.) were decorative. Flowering trees, like plum and cherry, and shrubs like azalea and kerria and climbers like wisteria were planted in great profusion. Hedges were of deutzia, kerria, azalea, the briar rose or the peony. Irises and chrysanthemums were also popular. The bamboos and pines provided a sombre background to this colourful vegetation. An account of Heian gardens is found in the *Tale of Genji*, written by the authoress Murasaki Shikibu. This was the age of women and apart from Murasaki Shikibu, a number of other women during this period contributed to Japanese poetry and literature.

In 1186 A.D., Yoritomo of the Minamoto family at Kamakura established the shogunate or military vice-royalty and the Emperor was reduced to a mere figurehead. The Ashikaga shoguns ruled in Kyoto and Tokugawas in Yedo (Tokyo). During the Ashikaga period (1400-1600 A.D.), Zen philosophy which laid emphasis on love of Nature, simplicity and refinement influenced all the arts including the art of gardening. In painting, the themes were landscape, birds and flowers. The famous gardens of Kyoto such as Tenryuji, Saihoji, Ginkakuji, Kinkakuji, Ryoanji and Daitokuji were all constructed from middle of fourteenth to sixteenth century.

The most memorable of the Zen Buddhist gardens is the moss garden of Saihoji temple in Kyoto. It was designed by the priest Muso Kokushi (1275-1351) in the middle of the fourteenth century. Under the shade of pines and maples is a thick carpet of mosses of many varieties. The shades of green which the mosses display are to be seen to be believed. It appears as if thick green carpets have been spread all over the floor of the forest. A winding foot-path laid at the sides of the garden provides a feast of green not to be experienced in any other place in the world.

There are some Japanese gardens which have no plants, and are composed of only rocks and sand. The temple garden of Ryaonji in Kyoto is a rectangle covered with coarse white sand dotted with groups of fifteen stones symbolising islands in an ocean. The landscape shown is expressive of poetic mood and exalted feeling. The garden of Daisen-in in Daitokuji temple in Kyoto designed by the Zen priest Soami in early sixteenth century is another garden of this type. In this garden flowing-water is represented by raked in white sand and groups of rocks are artistically scattered. Seen through diaphanous bamboo screens the abstract beauty of this garden is fascinating. It conveys romantic feeling for nature.

Another garden of great antiquity and beauty is the garden of Kinkakuji at Kyoto, popularly called the Golden Pavilion. This garden and the pavilion were

made for Yoshimitsu, the third Ashikaga Shogun in 1397. It was under the patronage of this Shogun that tea-ceremony and the art of flower arrangement developed as arts. The pavilion is a graceful three-storeyed tent-like structure covered with gold foil situated on the edge of a lake by the mountain-side. In the lake are a number of islands covered with pine trees.

An enchanting garden surrounds the Katsura palace in the suburbs of Kyoto. It was designed by Kobori-Enshu a master of tea-ceremony in 1642, under the patronage of Shogun Hideyoshi. In this garden we see careful use of evergreen trees with rocks of a variety of shapes, and stretches of water. It has many well-designed strolling paths, mountains, small lakes, islands and flowing streams. When Kobori-Enshu took up the assignment, he laid down three conditions with his patron viz., to put no limit on the money to be spent, not to hurry the work, and not to see the garden till it was finished. The last was to save himself from suggestions which might disturb his work. As the patron co-operated, the result was a perfect garden. Wherever you stand, the prospect is pleasing. It is a worthy tribute to a great gardener.

In 1867, the Shogun Yoshinobu surrendered his authority to the young Emperor Meiji. The capital was shifted from Kyoto to Tokyo. Present-day designs of the gardens of Japan belong to the Meiji era (1868-1912). It was during this period that the great reformation took place which placed Japan in the front rank of modern nations. During this period the gardening techniques of Europe had an impact on Japan. However with men of taste preference is for informal gardens of traditional type.

Tea-drinking was an integral part of the Zen cult. As such the tea-house, a simple thatched cottage, furnished with mats, became an essential part of the gardens. Originally tea was used as a medicine in Southern China. By fifth century it became a beverage. A Chinese scholar Luwuh formulated a code of tea in the eighth century which influenced Chinese ceramics also. In the early half of the sixth century, Bodhi Dharma, an Indian Buddhist saint came to Canton in China. He is regarded as the founder of Zen Buddhism. The word Zen is derived from Sanskrit '*Dhyan*' or 'meditation'. When asked by the Chinese Emperor, how to practice Zen, he replied, 'First put far away from you all anger and malice, and fill your heart with kindness and compassion.' When asked about Buddha, He replied, 'Buddha is Thought. It is hard to seek. Expanding, it covers the whole world; shrinking, it is too small to lodge a pin.'[4]

The Southern Zen sect of Chinese Buddhism formulated the ritual of tea in which the monks sat in front of the image of Bodhi Dharma and drank tea from a single bowl in turn. In 1191 Sung tea was introduced in Japan by Yeisazenji, a Japanese Buddhist saint. On account of its wakeful properties, it was used as an

[4]Arthur Waley—*An Introduction to the Study of Chinese Painting*, p. 217.

aid in meditation. In the fifteenth century under the patronage of the Shogun, Ashikaga Yoshimasa, tea ceremony became independent of religion. Yoshimasa retired in 1472 and devoted himself to aesthetic pursuits. He built the first tea-chamber in his 'Silver Pavilion'. It was a structure of refined simplicity designed by the finest artists of the time in which there was no place for gaudiness, loudness or richness. In the sixteenth century, Rikiu brought the tea ceremony to perfection. The tea-room contains a single painting or a flower arrangement placed in a shelf. As Okakura observes: "The ceremony was an improvised drama whose plot was woven about the tea, the flowers, and the paintings."[5]

A garden is attached to a tea house with a view to providing nature around. The outer section of the garden is called Sotoroji and the inner one as Uchi-roji. There is a waiting place attached to the outer-most section which is called Machi-ai. The visitors wait here till the master appears. A water basin is provided to enable people to wash their hands. Illumination is done with the help of stone lanterns. A path which is paved with stepping stones leads to the inner section. At the entrance of the tea house is a small gate through which the guests bow and enter after removing their shoes. A tea ceremony party consists of five guests. A two-step stone is laid near the entrance for depositing the swords carried by the guests. It was customary with the Samurai to carry swords during that period. As the guests enter, tea is served inside in an atmosphere of calmness. No loud conversation is permitted and no controversies are allowed to disturb the peace.

Broadly speaking, the Japanese gardens are of three types: hill garden, flat garden, and tea garden.

In a hill garden, the most important feature is a hill, with which are combined a pond and a stream. The Japanese name given to this arrangement is *Tsukiyama Sansui* or 'the hill and water'. A fairly large space is given to the construction of a hill and hence such hill gardens are not suitable for small areas.

A flat garden known in Japanese as *Hira-niwa* is laid out on a flat area and there are generally no hills or ponds present. A flat garden has no ups and downs. Stones, trees, stone lanterns, water basins and wells which form the various features are introduced into the scheme, so as to lend scenic beauty to the environment.

The Japanese landscape garden is the result of the efforts of priests and garden-lovers of Japan spread over a period of eleven centuries. It aims at providing in miniature the composition of a mountain-side landscape with a characteristic cascade, a small lake with an island, bridges, characteristically arranged stones and rocks, and ornamental stone-lanterns suggesting light. Its beauty slowly unfolds to the beholder. Straight lines are avoided, and emphasis is on meandering curve as seen in Nature. Instead of an artificial fountain a running stream or waterfall is selected.

[5]Kakuzo Okakura—*The Book of Tea,* Kenkyusha, Tokyo, p. 28.

Garden-bridges are planned so as to be ornamental as well as of practical use. Different types of bridges are used, i.e., bridges of stone, of wood and of earth. Repetition of the same style is avoided. *Yatsuhashi* is an unusual type of bridge which is made by arranging planks in a zig-zag manner.

An island in a Japanese garden aims at the reproduction of such a scene in Nature. It has rock as its foundation and over it earth is deposited. In some cases the island is connected with the land by a bridge, while in others it is left isolated.

A stone lantern is used for lighting a garden. Stone lanterns are of different designs, the more popular being the *Kasuga*, *Oribe* and the *Yakimi* types. These lanterns are kept at height varying from 2-7 ft.

The use of stepping stones is an essential feature of a Japanese garden. The aim is both beauty and utility. Too many curves are avoided. Places where the paths part are made conspicuous by the arrangement of somewhat larger stones. Paved walks made from stones and tiles are also provided at suitable places.

Stones are admirably used in a Japanese garden, their colour and shape deciding the selection. As a general rule, andesite, horustone, granite, clay slate and chlorite schist of suitable shapes are popular. Stones are rarely used in an isolated fashion, the common plan being to arrange them in groups of two to five.

Fences, made of wood, stones and bamboo are used in the garden with a view to concealing unsightly objects.

Water is the life of a garden, Moghul or Japanese. No one knows better than the Japanese landscape artist what compound interest in beauty he reaps by the repetition and reflection of his earthly garden in his watery one. Just as mirrors enlarge little rooms, so water in a garden doubles the interest, the beauty, and apparent size of the place in which it is put.

In the selection of trees for planting, needle-leaved and large-leaved ones receive much preference. Amongst the pines, Akamatsu or red pine, Kuromatsu or black pine and Himekomatsu which is also a kind of pine are in general use. The Japanese Cypress Ibuki Hinoki (*Chamaecyparis obtusa*), Sawara (*Chamaecyparis pisifera*) and Koyamaki (*Sciadopitys verticillata*) are the trees, with needle-like leaves and are generally used in a garden in Japan. There are many beautiful trees with coloured foliage. Out of them the most beautiful is Japanese *maple* (*Acer palmatum*) with delicate palmate leaves, red in November. Amongst the evergreens, the most popular are Mochi (*Ilex integra*), mokkoku (*Ternstoemia japonica*) and Kashi (oak). Tsubaki (*Camellia japonica*) is a popular flowering tree. There are seven species of Rhododendron (azaleas) with flowers ranging from white, pink to many shades of red. Ume (a kind of plum) and Sakura (cherry) are popular deciduous trees.

Pine trees which are great favourites of the Japanese are trained into artistic forms, and lean gracefully over the surface of the water. Sometimes trees are trained into fantastic shapes like sailing boats. Bamboos are great favourites on account of

graceful form of their leaves and stem. They are regarded as symbols of culture and refinement and lend grace and distinction even to a squalid place. They are symbolic of the character which the Japanese admire, that which bends before the storms of life but does not break. Cycas trees are grown near the houses to enjoy the music of pattering rain drops on their waxy leaves. In winter these tropical trees are protected by covering them with close-fitting jackets of rice-straw. Great attention is paid to the welfare of the trees, and when fruits are not edible, they are plucked off at any early stage to prevent a drain on the vitality of the tree.

The art of dwarfing *Bon sai* as it is called has considerably developed in Japan. There are trees scores of years old which look no bigger than saplings of 2-3 years. Trees are dwarfed by growing them in pots and mollusc shells, and by cutting their roots. They are trained to assume the shape of old trees. Thus the towns man can enjoy the beauty and feel the grandeur of ancient trees in his urban home.

Deciduous trees like cherries are transplanted even when as old as 30 years. When they are in a dormant condition and leaves have fallen, they are dug out, the branches are pruned, and the trees with as much soil clinging to the roots as possible are transported in trucks to their new homes and replanted. It is not uncommon sight in the cities of Japan to see people transporting their favourite trees along with their belongings when changing houses.

However, it would be erroneous to run away with the idea that a Japanese garden consists of a few plants, stones, bridges and stone-lanterns. The basic conception of the Japanese garden is calm and peace. It is a place where you come for meditation, a place where you retire to forget the worries of the world, and the hurry and bustle of life. The key to understanding of the art of Japanese garden-making is spiritual. It is an art whose aim is the refreshment of the mind.

You are not expected to hurry through a Japanese garden. The bridges, the stepping stones and rocks are so placed that you simply cannot rush through. The rustic shelters in the shade, the tea houses, the gold-fish in the pool, the soothing patter of water from the water-fall all tempt you to linger on. You admire the delicate rosy blossoms of cherry trees, and you open your heart to the beauty of white plum blossoms which display their lovely flowers against a background of deep green furnished by conifers, like cryptomerias and firs. Guarding the gate of the garden are two venerable pine trees symbolic of long life. Crimson-red azaleas lie bleeding on the rocks among the pine-needles. If there were ever a flower that personified colour then it is surely the azalea. There seems scarcely a shade of colour not to be found in its blossoms. To look at the azaleas is to look into the very paint-box of Nature itself. Irises display their beautiful flowers, proud of their glamour as they see their reflection in the limpid water of the pool. From your seat you watch the flight of birds, and contemplate the beauty of pink camelias and peonies.

As in the Moghul garden-craft, we find rich symbolism in Japanese gardening. The white blossoms of the plum are symbolic of spiritual beauty, while the pink cherry blossoms signify physical or sensuous beauty. The plum has inspired beautiful poems of sadness and war. In the white flowers of the plum, the Japanese sees the heart of a soldier, who has learnt the secret of Nirvana. A Japanese woman's beauty is frequently associated with the cherry-blossom, while her virtue is compared with the flower of the plum. The poet Mottori wrote: "If one should ask you concerning the heart of a true Japanese, point to the wild cherry flower glowing in the sun."

LIST OF JAPANESE TREES AND SHRUBS

A list of Japanese plants which can be introduced in different regions of India is given below:

Delhi

Berberis thunbergii var. *maximowiczii*
Chrysanthemum (Japanese large-flowered varieties)
Chrysanthemum (summer-flowering varieties)
Chrysanthemum japonicum (small-flowered varieties)
Cinnamomum camphora
Daphne odora
Daphniphyllum macropodum
Euonymus japonica
Euonymus japonica var. *aureo-variegata*
Euscaphis japonica
Fatsia japonica
Firmiana platanifolia
Gardenia jasminoides var. *grandiflora*
Gilibertia trifida
Ilex rotunda
Iris kaempferi (Japanese flag iris)
Lithocarpus edulis
Magnolia stellata
Magnolia verecunda
Mahonia japonica
Nandina domestica
Photinia glabra
Pieris japonica
Pittosporum tobira
Quercus myrsinaefolia
Quercus acuta
Rhaphiolepis umbellata
Stauntonia hexaphylla

Hyderabad

Berberis thunbergii var. *maximowiczii*
Chrysanthemum (Japanese large-flowering varieties)
Chrysanthemum (Japanese summer-flowering varieties)
Chrysanthemum japonicum (small-flowered varieties)
Cinnamomum camphora
Daphne odora
Daphniphyllum macropodum
Euscaphis japonica
Euonymus japonica
Euonymus japonica var. *aureo-variegata*
Fatsia japonica
Firmiana platanifolia
Gardenia jasminoides var. *grandiflora*
Gilibertia trifida
Ilex rotunda
Lithocarpus edulis
Magnolia stellata
Magnolia verecunda
Mahonia japonica
Nandina domestica
Photinia glabra
Pieris japonica
Pittosporum tobira
Quercus acuta
Quercus myrsinaefolia
Raphiolepis umbellata
Stauntonia hexaphylla

Mysore and Bangalore

Acer amoenum var. *sanguineum*
Acer ornatum var. *matsumurae*
Aroligia
Aroligia (Bladhia) japonica
Aucuba japonica
Berberis thunbergii var. *maximowiczii*
Camellia japonica (many hort. varieties)
Camellia japonica var. *rosacea*
Chaenomeles japonica var. *alpina* (Syn. *C. maulei*) (many hort. varieties)
Chrysanthemum (Japanese large-flowering varieties)
Chrysanthemum (Summer-flowering varieties)
Cinnamomum camphora
Corylopsis spicata
Daphne odora
Daphniphyllum macropodum
Deutzia gracilis
Diervilla decora
Elaeagnus pungens
Enkianthus perulatus
Euonymus alata
Euonymus japonica
Euonymus japonica var. *aureo-variegatus*
Euscaphis japonica
Fatsia japonica
Firmiana platanifolia
Gardenia jasminoides var. *grandiflora*
Gardenia radicans
Gilibertia trifida
Ginkgo biloba
Hamamelis japonica
Ilex latifolia
Ilex serrata
Ilex crenata
Ilex integra
Ilex rotunda
Kerria japonica
Lithocarpus edulis
Mahonia japonica
Magnolia kobus
Magnolia stellata
Magnolia verecunda
Nandina domestica
Paeonia suffruticosa (tree paeony)
Photinia glabra
Pieris japonica
Philadelphus satsumanus
Pinus densiflora
Pinus thunbergii
Pittosporum tobira
Prunus yedoensis (many hort. varieties-Gyoiko, Shogetsu, etc.)
Quercus myrsinaefolia
Quercus acuta
Raphiolepis umbellata
Rhododendron mucronatum
Rhododendron indicum (Syn. *R. lateritium*) (many hort. varieties)
Rhododendron obtusum (many hort. varieties)
Rhododendron pulchrum
Spiraea japonica var. *ovalifolia*
Spiraea prunifolia
Spiraea thunbergii
Stauntonia hexaphylla
Styrax obassia
Tamarix juniperina
Trachycarpus excelsus var. *fortunei*
Wisteria floribunda
Zelkova serrata

Ootacamund and Coonoor

Abies firma
Acer ornatum var. *matsumurae*
Acer amoenum var. *sanguineum*
Akebia quinata
Aucuba japonica
Berberis thunbergii var. *maximowiczii*
Aroligia (*Bladhia*) *japonica*
Cephalotaxus drupacea
Cephalotaxus drupacea var. *pedunculata*
Cinnamomum camphora
Camellia japonica (many hort. varieties)
Camellia japonica var. *rosacea*
Camellia sasanqua
Cercidiphyllum japonicum
Chaenomeles japonica var. *alpina* (Syn. *C. maulei*) (many hort. varieties)
Chamaecyparis obtusa
Chamaecyparis obtusa var. *breviramea*
Chamaecyparis pisifera
Chamaecyparis pisifera var. *filifera*
Chamaecyparis pisifera var. *plumosa*
Chamaecyparis pisifera var. *squarrosa*
Chrysanthemum (Japanese large-flowering varieties)
Chrysanthemum (summer-flowering varieties)
Corylopsis spicata
Deutzia crenata
Deutzia gracilis
Daphne odora
Daphniphyllum macropodum
Diervilla decora
Elaeagnas pungens
Euscaphis japonica
Euonymus striata var. *alatus*
Euonymus japonica
Ilex serrata
Juniperus chinensis
Kerria japonica
Lithocarpus edulis
Magnolia denudata
Magnolia liliflora
Magnolia kobus
Magnolia stellata
Magnolia obovata
Magnolia verecunda
Mahonia japonica
Nandina domestica
Paeonia suffruticosa
Pittosporum tobira
Podocarpus macrophyllus
Podocarpus nagi
Photinia glabra
Pieris japonica
Pinus densiflora
Pinus densiflora var. *umbraculifera*
Pinus parviflora (Syn. *pentaphylla*)
Pinus thunbergii
Prunus mume
Prunus yedoensis (garden varieties Fugenzo, Kanzan, Ichiyo, etc.)
Quercus myrsinaefolia
Quercus acuta
Rhaphiolepisum bellata
Rhododendron japonicum
Rhododendron inolicums (Syn. *R. lateritium*) (many hort. varieties)
Rhododendron mucronatum
Rhododendron pulchrum
Rhododendron obtusum (many hort. varieties)
Sciadopitys verticillata
Spiraea japonica var. *ovalifolia*
Euonymus japonica var. *aureo-variegatus*

Enkianthus perulatus
Fatsia japonica
Firmiana simplex (Syn. *F. platanifolia*)
Gardenia jasminoides var. *glandiflora*
Gilibertia trifida
Hamamelis japonica
Ilex crenata
Ilex integra
Ilex latifolia
Ilex rotunda
Spiraea prunifolia
Spiraea thunbergii
Stauntonia hexaphylla
Styrax obassia
Torreya nucifiera
Tamarix juniperina
Trachycarpus excelsus var. *fortunei*
Tsuga sieboldii
Wisteria floribunda
Zelkova serrata

Chapter X

WANDERINGS OF PLANTS

SINCE the time primitive man began to gather seeds from plants growing wild in the fields and to improve them by slow and crude methods, he has been enriching his diet by adding new varieties of food crops and fruit trees. After he conquered the barriers of land by domesticating the ox and the horse, and of water by inventing the canoe, an extensive exchange of plants has been going on between the continents of Eurasia and Africa. However, the Americas for a long time remained isolated from the Old World. If we examine our crops and trees, we find that a large number of them have been introduced from foreign countries. Potatoes which furnish food to millions came to this country from South America *via* Europe only in the seventeenth century. Quinine was unknown in the East and cinchona plants were introduced from South America into Java and other Eastern countries not very long ago. Soyabean was introduced from Manchuria into America and Europe and para-rubber from South America into Java, Malaya and India.

The black mulberry came from Iran. The pea-nut was introduced by the Portuguese into India and Africa from Peru. Papaya *(Carica papaya)*, whose fruit is a valuable source of papain—a digestive enzyme resembling animal pepsin and particularly useful to meat-eaters—is a native of Central America and the West Indies. A few high-yielding varieties like *Washington*, *Giant Hawaii*, *Ceylon*, *Long*, *Ranchi Mammoth* and *Calcutta* have been selected as suitable for India, and there is no doubt that there are others in their home countries which may repay introduction. Who can imagine Kashmir without its *chenars*, poplars and willows ? Yet these *chenars* and willows are exotics, introduced by the Moghuls from Central Asia, while the Lombardy poplar is a recent introduction. We may also mention that until recently the strawberry was practically unknown in the plains of northern India. It was introduced into Kapurthala from France by D. R. Sethi in 1918, and now it is commonly grown in the villages of Jullundur district of the Punjab.

Most of our ornamental flowering trees and garden plants have been introduced by garden-loving British travellers, explorers and government officers from foreign countries like South America, Madagascar, Malaya, Java, the West Indies and Burma. *Poinciana regia* and *Colvillea racemosa* were brought from Madagascar, *Jacaranda mimosaefolia* and the ramie tree from Brazil, *Brownea ariza* and *Bauhinia purpurea* from the West Indies, *Cassia javanica* and *Peltophorum ferrugineum* from Malaya, *Spathodea campanulata* from Tropical Africa and the double-flowering peach from

Japan. The dogwood tree *(Cornus florida)* with its beautiful white flowers of the United States of America deserves to be introduced into our hilly areas. The pink Bombax *(Bombax ellipticum)* of Hawaii is another desirable ornamental tree.

The seedless *Washington Navel* orange originated as a bud-sport of a Portuguese variety of orange in Brazil and was introduced into California in 1878. This variety is also a recent introduction into India and is becoming popular. The summer orange *Valencia* which ripens from February to April, is an introduction from the Azores, a group of Portuguese islands in the Atlantic.

One of the recent introductions is the teasel plant *(Dipsacus fullonum)* by Jai Chand Luthra who got a few seeds of this plant from the Botanical Garden at Duisberg in Germany in 1931, and successfully cultivated it in Kulu and Palampur in Kangra district of the Punjab. The heads of this plant are used for raising floss on the surface of woollen goods, and a few years' cultivation of teasel has made India independent of foreign imports.

In the United States of America, the Plant Introduction Service was organized by the State Department of Agriculture as long ago as 1903. David Fairchild, who has done a great service to his country by organizing this Service, also introduced some of our best Indian mangoes into Florida. The United States Plant Exploration and Introduction Service sent capable botanists like Walter T. Swingle and William E. Whitehouse to the unexplored regions of North Africa and Asia, and these explorers have amply served their country by introducing a large number of economic plants. It is perhaps not commonly realized that excepting persimmon, avocado, grapes, berries and a few plums, America had no important fruit trees, and the only known food plants were maize, potatoes, sweet potatoes and tomatoes. Most of the green vegetables grown in America have been introduced from outside.

In the State of South Dakota, Carleton and N. E. Hansen introduced a white-seeded variety of prosoa, a panicled millet from Semipalatinsk in Siberia. It is a catch-crop, maturing in 60 days and found suitable for a dry climate with an annual precipitation of eight inches, and may repay introduction into dry areas like those of Rajasthan.

Two most valuable introductions into the U.S.A. are the Smyrna fig and the date-palm. Along with the Smyrna fig, *Blastophaga*, a tiny pollinating wasp which carries pollen from the male tree (the Capri fig) was also introduced. The date-palm produces a more well-mineralized, high-flavoured and healthy human food per hectare than any other crop, excepting the banana.

Swingle introduced into the U.S.A. a number of varieties of date-palms from Morocco, Tripoli, Egypt, Arabia, Iraq, Iran and the southern States of America. He brought the remarkable *Medjhool* from the Taflilat region of Southern Morocco and *Deglet Noor* variety from Southern Tunisia. On account of these introductions,

more than a 1,000 choice varieties have been tested in the date-gardens of Southern California and Arizona, and the total annual production of dates in the United States of America exceeds 59,00,000 kg, which is one-quarter of her total consumption. In spite of its marked xerophytic character, the date-palm requires plenty of irrigation. The Arabs rightly say that the date-palm must have its feet in running water and its head in the fires of heaven. These conditions are met with in an ideal state in the canal-irrigated areas of the Punjab and Rajasthan. In spite of such favourable circumstances, we have introduced only a few varieties of the date-palm into India. Choice varieties of dates should be introduced on a large scale into the canal-irrigated areas and grown along the banks of canals and water courses. The date-palm is a tall tree and does not cast much shade, and as such, is not harmful to other crops.

With the coming of quicker means of transportation, particularly of the steamship and the railway, world exchange of plants has been going on at a quicker pace and on a much vaster scale. However, the possibilities of plant introduction, particularly from the point of view of plant breeding, are still far from exhausted. The cassava *(Manihot utilissima)* has been tried in South India. The starch-palm *(Bactris utilis)* which is so popular in South America, may prove to be of considerable value in tropical India. The tung-oil tree *(Aleurites fordii)* is being tried by the Forest Research Institute at Dehra Dun. With the diversity of climate which India possesses, there is no doubt that our stock of economic and ornamental plants can greatly be increased.

In India, we are fortunate in having a variety of soils and climates, and, plants from all regions of the world—from the arctic to the tropics—can find a congenial home here. A. C. Joshi has drawn our attention to the vast potentialities of our country from the point of view of plant introduction on account of its favourable geographical situation. Of the six 'primary centres' of origin of cultivated plants recognized by Vavilov and other Soviet scientists, three, viz., Central Asia, the mountains of Eastern China and the Indo-Malayan region, border on India. These are the homes of most Old World fruit trees. B. P. Pal thus summarizes the information about the various centres of origin of cultivated plants and possible causes of production of new varieties:

> "In their respective centres of origin, cultivated plants display a wealth of varietal diversity, which is not to be found elsewhere. A characteristic feature is that these primary centres frequently include a large number of genetically dominant characters.

> "The researches of Vavilov and his co-workers have shown that the region of north-western India and south-eastern Afghanistan is the place of origin of

> the soft and club wheats and also of many other field and garden crops such as rye, pea, lentil, beans, flax and carrot. The 28-chromosome group of wheats has had an entirely separate centre of origin in Abyssinia. The Eastern Asiatic region has probably seen the origin of rice, soyabean, and some of the millets. In the New World, the rather restricted territory of Central America (including Southern Mexico) is the home of such plants as maize, teosinte, the common bean, annual pepper, agave, anona, sapota and papaya. Tobacco probably originated in South America. It is also probable that the potato plant had more than one centre of origin. While the island of Chiloe and the neighbouring islands of the coast of Chile are probably the centres in which the common cultivated potato originated, many cultivated and wild species have originated in the Peru-Bolivian tableland."

It will be apparent that many of the important centres of origin are associated with the tropics or subtropics and the presence of mountains. This may, perhaps, be connected with the fact that in such regions an optimum of moisture, heat, light and substratum have afforded favourable conditions for the origin and accumulation of varietal diversity. Mountainous areas tend to act as isolators and thus may have played a part in the differentiation and divergence of species and varieties. An interesting speculation that cosmic rays might be responsible for the greater diversity and density of species near the mountain tops has been advanced by Dixon, Hurst and more recently by Hamshaw Thomas. The cosmic rays are particles of very great energy which are constantly reaching the earth in very great numbers and closely resemble the X-rays in their properties and effects. As X-rays are used for the artificial production of mutations, it appears possible that cosmic radiations may have been a factor in the production of varieties by direct action on the germ plasm. It is interesting to note that the centres of origin of cultivated plants are often near the centres of ancient civilization.

We can hope to achieve considerable improvement of our fruit trees if we explore these regions systematically. Apart from exploring the Himalayas and the mountainous regions of South India, we should send expeditions to China, Java, Malaya, Australia, Afghanistan, Iran, Iraq, Africa and Central and South Americas to search and bring new fruit and ornamental trees and shrubs as well as the wild ancestors of crop plants. For orchard fruit and nut-trees like apricots, peaches, plums, almonds, pistachio and walnut, Afghanistan, Iran, Iraq and Western Turkey should be explored. The Hindukush is regarded as the home of a number of important cultivated crops and will repay exploration from the point of view of disease and frost-resistance in crops.

China can also furnish us with a great variety of vegetables such as radish

and beans. B. P. Pal brought seeds of a number of Chinese vegetables to India. On account of the periodical ravages of floods and famines, the Chinese have investigated the food value of a number of edible weeds. *Momordica grosvenori*, the rare seasoning weed *lohan kuo*, is grown in the mountains of Kwangsi Province and is prized as a condiment as well as a remedy for throat and intestinal disturbances. Rhubarb is also of Chinese origin. *Ephedra sinica*, a valuable source of ephedrin and a well-known alkaloid used for throat and nose troubles, was introduced into California from China by Swingle in 1926. He spent a number of years in China exploring the interior of the country, and reported that there were a 1,000 distinct varieties of citrus cultivated in the provinces south of the Yangtze river. Some of these are hardy and disease-resistant and some are valued for their flavour. Some varieties grown in California have their home in China. However, it may be mentioned that even with their efficient Plant Exploration and Introduction Service, the Americans have not tested more than 10 per cent of the Chinese varieties. South China, the home of the orange, deserves close exploration.

In most countries, excepting the U.S.A. and the Soviet Union, the work of introduction of new plant material and its use in hybridization with local varieties has been carried out on a limited scale. In the Soviet Union, Vavilov and his co-workers have collected plant-breeding material from many countries. Numerous wild species of wheat and barley have been collected from Abyssinia, Turkey and Afghanistan and many species of peas, beans, tomatoes, onions, melons, pears, peaches, apples and grapes from countries the world over. As a result, cold-resisting and early-maturing varieties of wheat have been propagated in Siberia which served as the Soviet bread-basket when Ukraine was occupied by the Nazi armies in the Second World War.

Considering the variety of plant material at the disposal of the Soviet plant-breeders, endless possibilities of origin of new plants arise. How this has affected the outlook regarding the future plant-breeding work can be well judged from the following remarks of Vavilov himself: "Our ideas about such plants as the potato have been entirely revised. The whole work of breeding and genetics had been formerly based on one Linnean species, *Solanum tuberosum*, whereas the expedition to South America has disclosed the existence amongst the cultivated potatoes at its original home of no less than thirteen well-defined Linnean species, many of which are of great practical interest. These species differ from one another in the chromosome number, morphological and physiological characters and area of distribution. They contain species and forms which are extremely resistant to disease and frost. The potatoes formerly known to geneticists and breeders were only fragments of one species, collected at random by the first travellers, and, on these the whole of the breeding and genetic work of the nineteenth century and the beginning of the twentieth century has been based."

Besides the cultivated plants, we must also take into account the wild plants. There was a time when wild plants were considered to be of interest to the taxonomist only. It is now admitted that greater possibilities in breeding can be realized by making use of the wild relatives of our cultivated plants. By virtue of their persistence and habitat under arduous conditions of climate and soil, the wild plants possess some useful economic characters such as resistance to cold, drought and disease. Many instances may be quoted of the successful utilization of wild forms in the solution of economic problems in plant breeding. The Java sugar industry, which was at one time threatened with collapse on account of serious losses caused by the sereh disease, was saved by the timely introduction by Kobus of a wild variety of cane from India known as *Chunnee.* The famous series of canes developed at Coimbatore has been the result of crossing with the wild species *Saccharum spontaneum.* The production of perennial hardy varieties of wheat by Tzitzin in Russia by making use of the wild grass *Agropyron* is another outstanding example. These wheats are considered very promising for new tracts with highly unfavourable weather conditions. Harland has reported interesting results in cotton. The hybrid of the wild Hawaiian species *Gossypium tomentosum* with Sea Island has produced a beautiful khaki lint of Egyptian quality, and is completely immune to attacks of leaf-sucking insects. Potato-breeding work has been revolutionized by the discovery of wild tuber-bearing species *Solanum demissum, S. acaule, S. commersonii,* etc., some of which are resistant to frost and others to late-blight caused by *Phytophthora infestans.*

Though the contribution made by explorers and travellers of the nineteenth century is very valuable, the time has come when we must recognize that a work of such importance cannot be left to the whims and fancies and the comparatively poor resources of private individuals. A systematic, organized and planned effort is needed to place the plant exploration and introduction work on a sound national footing.

Chapter XI

NATURE CONSERVATION AND NATIONAL PARKS

EXCESSIVE urbanization created by the nineteenth century industrialism has torn away a large number of persons from the environment of trees and open fields. Thousands of townlings seldom see the morning sun and the starry sky except through a haze of dust and smoke. In sprawling cities like Calcutta and London, people get conditioned to a mode of life, a life which rolls along tarred roads to the tune of a world of noises. In such surroundings, one feels stifled, and one's soul begins to wither. After a year's stay in London, I felt a strong urge for a touch of the soil. When after a long time, I handled clods of earth in Hampstead Heath, I felt revivified. It was my peasant soul craving for contact with mother earth and longing for the solitude which the countryside alone can provide, that was finding satisfaction in an environment which was the nearest approach to a village in London. In England, under the spell of urbanism, they allowed their agriculture to decay, and only lately, realization has come to the British people that agriculture is something more than a mere industry. We should guard against the decay of our rural life, and must not lose sight of the fact which has been realized by G. M. Trevelyan that "agriculture is not an industry among many, but is a way of life, unique and irreplaceable in its human and spiritual values."

The soul of urbanized man is becoming more and more warped. A large number of men and women in our urban areas live maimed and thwarted lives. Living in an artificial environment, they become physically and mentally more and more flabby. As Professor C. E. M. Joad observes:

> "Nature is the mother of our race; we have evolved as part of a natural process and our ancestors lived for millennia in natural conditions. As a result, there lies deep-seated within us a natural love of country sights and sounds and smell and an instinctive need for occasional moments of quiet alone with nature. The smell of fallen leaves or new-mown hay, the tang of a mountain brook, the feel of lush meadow grass against the face, the texture of the bole of an oak, or the sight of its first young leaves showing yellow-green against the April sky, these things touch in us an ancestral chord that stretches back to our savage, perhaps to our sub-human past."

One of the surest remedies for curing the sickness of the soul is reviving contact with nature. While urbanized man tries to satisfy his appetites in a world of eating-

houses, movies and radios, he forgets that he has a mind and a soul which, cut off from nature, the fount of all life, is slowly withering. The spirit of God manifests itself in the grandeur of the mountains, and their flower-filled valleys, in the needle-like Himalayan firs and deodars pointing their green fingers towards the sky, in the gushing torrents and roaring rivers pounding their way to the plains, in the forests blazing with blossoms of flowering trees, in the great banyan trees with spreading crowns standing and contemplating the spectacle of life, and in skeins of ducks and wild geese flapping their wings over *jheels* lit up by the rays of the morning sun. Our trees, our mountains and our wild birds make India what she is. So the preservation of our fauna and flora in national parks, nature reserves and sanctuaries is one of the conditions necessary for our development as complete human beings with minds and spirits as well as bodies and appetites.

The concept of nature conservation embraces several distinct purposes such as conservation of plant and animal life, the scientific aspect which includes biological research, field research and experiment, the amenity aspect which deals with the aesthetic and recreational side, and the educational aspect. The aesthetic and recreational approach places the main emphasis upon preserving the characteristic beauty of the landscape and upon providing ample access to and facilities for open air recreation and for the enjoyment of beauty in those areas. The major features of the park are made easily accessible by providing roads, tracks and bridges, and living accommodation in the form of hostels, etc. The scientific approach which in no way underestimates aesthetic values, was primarily directed to the advancement of knowledge and its application to human welfare. "The educational aspect", as the Special Committee on Wild Life Conservation in the U.K. observes, "is in many ways complementary to each and all of the others. True appreciation of scenery rests in part upon, and is certainly enhanced by, some understanding of the rocks and the variety of landscape which they induce, the shape of the valleys and summits, the flow of the streams, the cliffs and the dunes and flats of the coast, and all the rich verdure with which they are clothed. They are things which can invigorate and refresh the mind and upon them a deep culture can be based. The more widely this appreciation can be diffused, the sounder will be the mental and physical health of the nation."

The types of areas which are in need of conservation can be classified under the following categories:

1. National Parks and Nature Reserves: National Parks may be defined as extensive areas of beautiful and relatively wild country with characteristic landscape beauty, which are also wild life sanctuaries for the preservation of big game, or other mammals and birds, and, where access and facilities for open air enjoyment are also provided,

so that the people may be able to observe wild life of all kinds in its natural surroundings at close quarters. In the national parks, there is also a need for the creation of nature reserves, which are not accessible to visitors, to serve as breeding reservoirs for shy animals which deserve encouragement.

2. Geological Monuments and other Areas of Outstanding Value: These include rocks, exposures or sections which, because of their great geological interest, should be preserved as geological monuments, and which should be given the same protection as archaeological buildings and monuments. These should be protected from mining, excavation, prospecting and drilling or similar operations.

3. Local Educational Reserves: These include small areas of local country containing representative local flora, which are reserved for educational purposes for the benefit of schools and colleges.

An uncontrolled destruction of wild life has been going on in many countries of the world, and, as a result, natural fauna has dwindled and many species have become extinct. In West Europe and countries like England, the process of death and destruction has reached such limits that the sight of a wild bird or animal is regarded as an event of such importance as to inspire many lovers of nature to write letters for publication in the *Times*, saying that they heard a cuckoo at such and such a place. With the modern means of rapid transport such as the motor car, jeep and aeroplane, the whole world is becoming so speedily opened up to travellers, tourists and traders, and with the increasing population so much uncultivated land is coming under the settler's plough, that the need for the preservation of fauna in national parks and reserves is being increasingly felt.

Credit goes to the United States of America for giving a lead to the world in establishing national parks and reserves. The first great national park, the Yellowstone in the United States, dates from 1872. In 1916, the National Park Service of America was instituted to look after those areas of scenic beauty set aside by Congress to conserve the scenery and the natural and historic objects and the wild life therein, and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations. These parks are also wild life sanctuaries which provide shelter to animals like the bear, bison, deer, elk, moose, antelope and the mountain sheep.

Forests in national parks are preserved for their beauty and scientific value. In the Sequoia National Park in California, are groves of the world's oldest and biggest trees, sequoias, which are 3,000- to 4,000-years-old with trunks up to five m.

in diameter. In the Mt. Mckinley National Park in Alaska, there are extraordinary areas for the study of glacial action. In the Grand Canyon National Park of Arizona can be seen the most interesting examples of water erosion. Here the Colorado river has cut 19 canyons, of which the Grand Canyon is about two km deep, and is flanked by intricately carved and most gorgeously coloured rocks. In the Saguaro National Park in Arizona can be seen segments of the oldest desert of the world with desert animal life and a large variety of cacti and other xerophytic plants. In the petrified forest of Arizona are well preserved fossil tree trunks, sometimes five feet in diameter and fifty feet in length. These petrified logs are so well preserved that even the texture of the wood can be clearly seen.

In 1940, the U. S. Bureau of Biological Survey was fused with the U. S. Fish and Wild Life Service, which concentrates mainly on vertebrates including game and fur-bearing animals. The refuges of these animals are of immense size and habitats are artificially controlled or improved to accommodate or attract particular birds and mammals.

The lead given by the U. S. A. has been followed by other countries such as Canada, Australia, New Zealand and the Union of South Africa. In Canada, the first national park was established in 1885. South Africa has several long-standing national parks. Her Sabi Game Reserve was founded in 1898 and renamed as Kruger National Park in 1926. The Albert National Park in Belgian Congo was created mainly due to the efforts of the American naturalist Carl Akeley. Due to the creation of this sanctuary for wild animals, the gorilla has been saved from extinction. New Zealand has one huge park, 'Fjordland', 9,000 km^2 in area. In Europe, Sweden, Poland, Holland, Italy and Switzerland have established national parks and reserves.

In India, the necessity of creating national parks has met with tardy recognition. Baini Prasad has thus summarized information about national parks in India:

> "In 1934, a very great advance was made in Uttar Pradesh through the great personal interest taken by the enlightened Governor of the State, Sir Malcolm Hailey, as a result of which the National Parks Act of 1934 was passed. This Act provided for the establishment of national parks and for the preservation of wild animal life or other objects of scientific interest and for incidental matters provided therein. As a result, the Hailey Park was demarcated as a national park in the famous Patli Doon and the hill forests to its south, consisting roughly of an area of 256 km^2. Under the Act, the word 'animal' was defined as 'mammal, reptile, or bird', and it was an offence to kill, injure or disturb any animal or to take or destroy any eggs or nests of any bird from the park. The conditions under which the people

were allowed to enter or reside in the park were laid down in the Act and to be enforced by the Forest Department. In Assam, certain areas had already been demarcated as game sanctuaries and more stringent action was being taken to preserve the wild life, which, according to some reports, had been reduced by almost 75 per cent within recent years. Reference may also be made here to the Chamrajanagar Sanctuary of the Mysore State Forests which was established with a view to offering complete immunity to animals, particularly wild elephants, thereby making it possible for them to thrive without interference. Introduction of other animals not found in the area was to be attempted, and the Sanctuary was to provide facilities for the scientific study of the life-histories of different indigenous species of game."

Since then, other States have also fallen in line and have enacted legislation for the preservation of wild life by declaring certain areas with well-defined boundaries as national parks or game sanctuaries or reserves. Some of them, as in Mysore and Kerala, are well stocked with natural fauna in an undisturbed forest.

One of the most beautiful wild life sanctuaries in India, the Periyar Wild Life Sanctuary, is in Kerala State. Covering about 777 km², the Sanctuary is situated at an average elevation of 900 m. Inside it is the famed Periyar Lake covering an area of 265 km² and surrounded by grassy hills and valleys with forest groves along its borders. It is well stocked with elephants, bisons, samburs, wild bears, jungle sheep, tigers, and panthers. In summer, when the springs in the hills dry up, the wild animals are attracted to the Lake, and they romp about on its long stretches of green grass or rest in the welcome shade of the forest trees. Tourists boating on the Lake get a close view of the animals resting in the open. The long range of hills and valleys covered with colourful flowering trees presents an enchanting sight to the spectator. An additional attraction is the ancient Sabarimala Temple situated within the Sanctuary which draws thousands of pilgirms every year. The Sanctuary area is permanently closed to all shooting, hunting, cutting down of timber, grazing of cattle and collection of minor forest produce.

Another sanctuary that deserves mention is the Mudumalai Wild Life Sanctuary situated in the Nilgiris in Madras State. Covering an area of 300 km², it is 67 km from Ootacamund along the Ooty-Mysore Road which commands magnificent views of hills and valleys. Hunting, shooting or snaring of animals is not permitted within the Sanctuary, which has a large population of elephants, bisons, spotted deer, tigers, panthers, bears, wild pigs, barking deer, hyenas, four-horned antelopes, samburs, Nilgiri tahrs, grey langurs, the Nilgiri langurs, Malabar squirrels, mouse deer, civet cats, red mongoose, flying squirrels, wild dogs, grey jungle fowls, spur fowls, quails, partridges, green pigeons, Malabar trogons, black-headed orioles and wood pigeons. A few trained elephants are maintained for taking the visitors round.

The Kanha National Park and Game Reserve, 55 km south-west of Mandla in Madhya Pradesh, is one of those rare spots where undisturbed nature can be seen in her glorious splendour. The Reserve occupies an area of about 251 km^2 and has such animals as the tiger, panther, *cheetal*, sambur, *barasingha*, black-buck and barking-deer. The main part of the Game Reserve is a plateau nearly 900 m above the sea level, and includes the catchment area of the Banjar river. It has green grass even during the months of May and June when elsewhere pastures dry up. The Park area has been famous for its fauna and flora and was, till recently, an excellent shikar haunt for big and small game. It attracted many sportsmen even from far off countries, who were enchanted by the beautiful *sal* forests of the Kanha Valley. Captain Forsyth in his 'High lands of Central India' describes these forests as follows:

> "The valleys themselves are generally open and free from all underwood, dotted here and there by belts and islands of the noble *sal* trees, and altogether possessing much of the character ascribed to the American prairies. And in many places springs of clear, cold water bubble up, clothing the country with belts of perpetual verdure, and conferring on it an aspect of freshness very remarkable in a country of such comparative small elevation in the centre of India. Everything combines to deprive this region of the sterile and inhospitable appearance worn by even most upland tracts during the hot season. Throughout the summer, the glossy dark-green foliage of *sal* reflects the light in a thousand tints, and first when all other vegetation is at its worst, a few weeks before the gates of heaven are opened in the annual monsoon, the *sal* selects its opportunity of bursting into a fresh garment of the brightest and softest green. But for the bamboo thickets on the higher hills whose light feathery foliage beautifully supplements the heavier masses of the *sal* that clings to their skirts, the scene would present nothing peculiar to the landscape of a tropical country."

The evergreen *sal* and the year-round fresh pasture in this Reserve are responsible for the abundance and variety of game. The cool summers invite swarms of birds to nest in the forest, and the Reserve has been the famous haunt of many species of birds such as the pea-fowl, jungle fowl, sand grouse, quail, green pigeon, blue rock pigeon, snipe duck, common teal and the *brahmi* duck. A winding network of roads touches all the salient points in the Park. Facilities have been provided for observing wild animals such as tigers, panthers, bears, samburs, spotted deer, four-horned antelopes and a variety of birds, in their natural habitat. A well-equipped booth with electric installations has been set up for studying the habits of tigers, and for photography. Three beautiful lakes provide an added attraction.

There is a clear need for establishing nature reserves within national parks. The principal purposes of such nature reserves, as given by the Wild Life Conservation Special Committee of England and Wales and which are applicable to India as well, are as follows:

> "To conserve and manage, for the enjoyment and interest of visitors, and for the use of naturalists, students and teachers, sites of biological, physiographical and geological importance and characteristic stretches of the natural vegetation. Similar considerations would apply in a less degree to other areas which, though not so valuable on strictly scientific grounds, have just as much importance because of their general charm or because they contain objects of marked beauty—whether rocks, trees, or flowering plants.
>
> "To establish breeding reserves within the park, for scientifically encouraging particular species or communities of species the preservation or wider spread of which is found desirable. In such reserves, public access would have to be more or less restricted.
>
> "To set aside areas so managed as to attract rare, interesting and beautiful species not at present living in the park or its surroundings."

The authorities responsible for the management of the reserves should keep in close touch with the university and educational centres, as well as local natural societies. A need would also arise for providing small handbooks on nature reserves, explaining, with the aid of maps, photographs and sketches, the scientific significance of the reserve.

Lack of field training for teachers as well as students is one of the most serious deficiencies in the current biological education in India. Without field training or facilities for nature study, the teaching of Botany or Zoology tends to become lifeless and warped. Thus, there is need for local educational reserves for all colleges where biological sciences are taught. The local educational reserve is the counterpart of the college museum and the laboratory. These reserves would open a vast and stimulating field of knowledge in a discipline which trains such mental attributes as acute power of observation, patience, concentration, detailed ordering of thought, and the appreciation of form and colour. Visits to these reserves under proper guidance would provide a liberal education to the students in one of the most stimulating and formative fields of thought. These are gains which cannot be measured in terms of money. A beginning in this direction has been made in Delhi State, where the local government has placed an area of 8 hectares on the Ridge at the disposal of the Department of Botany, University of Delhi. This piece of land

will be enclosed with barbed wire; representative trees and shrubs will be labelled and efforts made to introduce other local plants also which can grow under these conditions.

With the liquidation of the feudal order and the merger of States into the Union of India, the problem of wild life preservation has acquired a new significance. It must be said to the credit of the princes and rajas that they preserved the wild animals and forests of their States rather well. With the demand of cultivators that their crops be saved from wild animals, there is need for the formulation of a clear policy on wild life preservation. There is immediate need for an initial survey of all proposed national park areas. While there is a necessity of maintaining a good vegetational balance and preserving the rich flora and fauna in national park areas, the general wild life policy must be such as will not prejudice the use of developed agricultural land. The interests of the cultivator and the lover of nature must be harmonized. The apprehensions of farmers, that national parks and nature reserves will develop into uncontrolled sanctuaries where pests and weeds will be allowed to flourish and which will spread into surrounding agricultural lands, must be allayed. Biologists must give lists of harmful and useful birds and animals. While such of them as are friends of the cultivator are encouraged in the national parks, the enemies must be exterminated. The biologists should also give advice on whether campaigns should be started for the destruction of wild boars, porcupines, monkeys, bats and parrots which cause enormous damage to crops and gardens. Before any such campaign is started, it should be ascertained whether wholesale destruction of certain birds or animals will have harmful repercussions elsewhere by upsetting the balance of power between the various organisms. An action, which *prima facie* may appear sensible and desirable, may have far-reaching and most unpleasant and unforeseen consequences fifty years hence. As the authors of the report on *The Wild Life Conservation* observe, "A conservation policy directed to maintaining any particular biological equilibrium entails constant vigilance and a fine-scale 'management' of a kind comparable to the most highly developed farming." The Special Committee further recommends the establishment of a National Biological Service, which should include not only systematists but also others. As the Committee further observes, "Though the ability to recognize and name an organism is the first essential stage, it is by no means the last. The ecologist, the plant or animal physiologist, the geneticist, the student of behaviour, the soil scientist, the climatologist and the statistician, each has his prominent place in the picture. But standing level with the biological sciences, though too often neglected in the context of nature preservation, are the geological and physiographical sciences; for, it is from the nature and distribution of the rocks and from the configuration of the earth's crust that the natural beauty of scenery and its living carpet are derived."

In January 1935, the Government of India convened at Delhi an All-India

Conference for the preservation of wild life with a view to reviewing the position of the fauna and flora as it existed at the time and considering generally the problem of protection of animals peculiar to India. The Conference prepared two lists of species: first, of animals that were to be protected as completely as possible, and second, of those which could only be hunted, killed or captured under a licence, in some cases subject to a bag limit. The Conference laid stress on the establishment of wild life sanctuaries. It was also recommended that the duty of preserving fauna should be assigned to the Forest Departments in areas under their charge, and the necessity of co-operation of the police and magistracy was also urged.

A comprehensive protective legislation was enacted in 1933 in the Punjab Wild Birds and Wild Animals Protection Act. Wild birds and animals were classified into three categories:

1. Wild birds and animals which are excluded from protection:
2. Wild birds and animals which may be killed and captured without a licence during a specified period; and
3. Wild birds and animals which may be killed or captured under a licence, subject to a bag limit in some cases, during certain seasons. Shooting of these is prohibited during the breeding season, which is the close season.

To administer the Act, a Game Warden was appointed for the States of the Punjab and Delhi. A Game Inspector was appointed in each district with a number of Game Watchers. In addition, District Fauna Committees with the Deputy Commissioner as Chairman were established in each district for advising generally about the protection of fauna in their respective districts, and for educating the public mind on the necessity of preserving wild life. The District Fauna Committee of Delhi, has done exceedingly useful work. Pictorial charts showing the close season and the bird, and animal friends and foes of the cultivator were published for wide circulation in schools, *panchayatghars* and police stations.

The Wild Life Preservation Act, at present in force in many of our States, should be made more comprehensive, and, cognizance should be taken of the plant world, too. Plants which are rare or striking, beautiful or odd should be scheduled for protection in areas where this is necessary. Rare plants like species of lycopodium, ophioglossum and osmunda, and beautiful plants like orchids, rhododendrons and meconopsis, which are liable to excessive collection by botanists, and which are widely plundered and uprooted by 'pleasure-pickers', should also be given protection, and their collection should be permitted only under proper control.

There are a number of giant trees scattered all over the country, which are known only locally, barring a few like the well-known banyan tree of Sibpore Bota-

nical Gardens, which covers acres of land. In almost every district, there is a tree of mythical age, which attracts the curiosity of people, and is often worshipped. Where religion has sanctioned them, or superstition has invested them with magical powers, these trees are protected by the people. The *pipal (Ficus religiosa)* and banyan *(Ficus benghalensis)* are regarded as sacred, and only in the direst extremities of a famine will their leaves be cut for cattle. The *jand (Prosopis spicigera)* is reverenced in the arid districts of the Punjab and is commonly selected to mark the abode of a saint or a deity, and rags are tied to its branches as offerings. There was a general sentiment against cutting of trees among Hindus, which has given them effective protection so far. In most villages, sacred groves are found from which no one may cut wood or pick fruit. The Bishnois of Hissar and Rajasthan object to cutting a tree growing by a pond. The reverence for tree life has gone to such extremes that wood-cutting and kiln-burning are regarded as unlucky occupations as both of them involve the destruction of living trees and of insects in the earth in the burning of bricks. That is why wood-cutters and kiln-burners are said to be short-lived.

Where religion has given protection to certain ancient trees, little more is required. The sorrow-removing *ber* tree *(Ziziphus jujuba)* of the Golden Temple at Amritsar and the sacred *garna (Carissa spinosa)* of village Bodal in Hoshiarpur district are trees of great antiquity, and are held in great reverence by the Sikhs. Besides these, there are many trees which are in need of special protection. There is a giant *arjan* tree near Agra which deserves such protection. The biggest mango tree in the world is growing in an obscure village named Burail in *tahsil* Kharar, Ambala District, and came to public notice only during the anti-capital agitation, as this village happened to be included in the proposed site for the new capital of the Punjab. It has been given the name of 'Chhappar' or thatched house, probably because it gives protection to a number of wayfarers from the heat of the sun and the rain. The circumference of its stem is 10 m. It has nine main branches trailing close to the ground, 1.5 to 3.6 m in circumference, and 21 to 24 m in length. Each of these branches looks like a giant tree. The total area occupied by the crown of the tree is 2,257 m^2. The average yield of the tree is reported to be 168 q. It is said that when 20 cartloads of mangoes plucked from this tree reached Patiala a few years ago, people asked whether a whole orchard had been plucked. It is desirable that such trees should be given legal protection as national monuments.

Some of the Himalayan valleys are in grave danger of losing their character on account of excessive grazing and growth of rumex. Apart from other vegetation, the sheep and ponies which are taken to alpine meadows above the tree-line by graziers in the months of April and May graze mainly on rumex. A symbiotic relationship has developed between the sheep and rumex. While the sheep feed on rumex, in their turn, they manure the pasture land with their droppings, which, in turn, further promotes an extensive growth of rumex. The result has been that

more attractive, but less edible alpine plants are driven out by rumex, which now covers big areas in the alpine valleys of the Himalayas like that of the Pindari glacier. In the interest of the tourist industry, it is very necessary that some of the beautiful alpine valleys of the Himalayas are declared as plant sanctuaries; and not only the collection of beautiful and rare plants controlled, but the grazing of sheep and cattle also prohibited. This is necessary in the interest of the tourist industry and botanical studies, as much as for checking soil erosion.

Nature conservation and conservation of soil, forests, grassland and water are intimately interconnected. Most changes in nature are slow, insidious, and not readily detectable. A change in the balance of power between small organisms in the soil, a slowly dropping water-table—these are potent factors in the destruction of a countryside. What has to be done to conserve the soil and water resources so as to maintain or establish a series of varied and most delicately balanced conditions ? This question is just as fundamental to agriculture, horticulture, forestry, game preservation and fisheries, as it is to the management of national parks.

Soil erosion occurs as a result of the removal of the plant cover on account of deforestation by man or by the uncontrolled grazing of cattle and goats or the utilization of grasslands for agriculture. To understand the disastrous results of soil erosion it is necessary to know what soil is.

Soil is more than a mere disorganized rock material. It has been aptly described as a living organism. Apart from the soil particles, there are numerous bacteria, protozoa, diatoms and other soil micro-organisms along with the decayed remains of plants which compose the soil. Leaves of trees, bushes and herbs form a protective cover which acts as a sponge, absorbing the run-off water. This water percolates through the humus layers to the minerals of the soil and accumulates in underground storage reservoirs, which give birth to numerous fresh-water streams. With the plant cover removed by the action of man and animals, the run-off discharge of water increases at an alarming rate. Gorrie has made observations on the run-off data in the Pabbi Range, Jhelum District, and has found that in an area which is fairly covered with trees, the maximum run-off is less than 250 cusecs per square kilometre, while in the land where persistent cattle and buffalo-grazing has destroyed the plant cover, the run-off rises to 4,000 cusecs. Moreover, silt-laden water has a sealing effect on the pores of the soil and the amount of seepage is considerably reduced. The silt-laden water has also a sand-papering action on the floor and sides of the channel. Valuable salts containing potassium, phosphorus, calcium and nitrogen as well as micro-organisms, which play an important part in the proper development and functioning of the roots, are lost.

When more surface soil is washed away, clefts appear and gullies are formed. During monsoons, the rain water rapidly flows away, flooding the countryside. Thus water conservation becomes a serious problem; the water level falls and the

country in general, becomes dry and barren. The land becomes useless for agriculture and does not even produce enough grass. The repercussions of all these changes on wild life are serious. With the disappearance of grasslands, forests and fresh water streams, wild life also begins to disappear. The erosion problem of the Siwaliks is a case in instance.

Records, which are available, show that in the middle of the nineteenth century, these ranges were covered with thick vegetation, which harboured a number of wild animals. These forests were protected by the feudal landlords and rajas for shikar. In the conditions which prevailed in the last phases of the Sikh rule and the early days of British occupation of the Punjab, the hillmen further encroached upon the forests. Grazing of goats and cattle and the cutting of trees continued unchecked for a long time. In the early nineteenth century, the *chos*, which are now torrential monsoon rivers, were perennial fresh-water streams which furnished valuable irrigation in the submontane area of Hoshiarpur. With the disappearance of the plant cover, these perennial fresh-water streams became torrential monsoon rivers, which now wash away large quantities of soil and have covered fields, which were once fertile with sand. The forest-covered Siwaliks have degenerated into bare hillocks which are not capable of producing enough even for the starving population of human beings, goats and cattle, much less of providing food and shelter to wild life.

What remedies should be adopted to check soil erosion ? Closure to grazing and its substitution by grass-cutting and stall-feeding, and replacement of goats by sheep which are less destructive, have been suggested. Agricultural practices in areas in the Himalayas and submontane areas also need to be modified. Terracing, bunding, contour ridging, contour furrowing, crop rotation and strip cropping also require attention. However, the sovereign remedy is reafforestation, and, 'PLANT MORE TREES' should be our slogan for the next decade.

Chapter XII

TREE-PLANTING PLAN OF NEW DELHI

WHEN the famous architect, Sir Edwin Lutyens came to New Delhi, he asked for a list of trees which could grow there. Griessen of the Horticultural Department prepared a list of trees and shrubs that might be made use of in the planting scheme of the new capital at Delhi. Griessen planted the laid out roads, but on account of unsatisfactory water supply, most of the roads had to be replanted several times. Griessen retired in 1920 and was followed by Mustow who established the nursery at Jor Bagh, opposite the Safdarjung tomb. Thence-forward, most tree-planting and much that grows in New Delhi, owe their existence to Mustow. He afforested the ridge. He introduced the mesquite from Mexico, and thus gave India a hardy tree which may even help to make Rajasthan green. Generally, road avenues were inter-planted; quick growers between the permanent and slow growers. Most of that interplanting has been cut out.

The tree-planting plan of the modern city of New Delhi can serve as a model for many of our towns which have irrigation facilities. Extensive use has been made of many of our flowering trees for brightening up the housing areas, squares and circuses. For avenues, *Eugenia operculata* with its light-green leaves has been found to be the most suitable in New Delhi. It sheds its leaves in late February and renews them in early March, after remaining leafless for only a few days. It has a compact semi-globose crown and its light-green leaves are very soothing to the eyes. Avenues of this beautiful evergreen species adorn the parks on both sides of the Kingsway, and are also planted on many roads. Other successful roadside trees are *Kigelia pinnata*, *Pongamia glabra*, *Ficus retusa*, *Ficus infectoria*, *Celtis australis*, *Sterculia alata*, *Cassia fistula*, *Anthocephalus indicus*, *Hardwickia binata* and *Melia azedarach*.

The Secretariat and the Government House are the nucleus of the layout of New Delhi, and a number of roads radiate from them. The clipped bushes of *Diospyros cordifolia* in the lawns in front of the Government of India buildings look very attractive. The trees annually receive a light pruning treatment, the branches being cut at a certain height above the ground. This leaves space for pedestrians to wander about below, and the Pathan type of hair-cut which the trees receive gives them a smart appearance. The clumps of jacarandas at the corners of the two Secretariat buildings are a beautiful sight in the month of April.

Most of the circuses in the centre of road junctions are enlivened with clumps of flowering trees like jacarandas, *amaltas*, *gulmohur* and *kachnar*. Where space available is narrow, use has been made of shrubby climbers like the various species of bougainvillaea and *Petraea volubilis*.

The squares in housing areas have been planted with all types of flowering trees. The *semals* in Hastings Square with their flaming red flowers are a sight in the months of March and April. Purple and mauve *kachnars* lend grace to many squares.

Flowering trees have also been planted at the edges in the compounds of bungalows which are maintained under the supervision of the Public Works Department. At the gateways, bottle-brush trees with pendulous branches are commonly grown. We also find trees of *Jacaranda mimosaefolia*, *Bauhinia variegata*, *B. purpurea*, *Erythrina indica*, *Grevillea robusta* and *Ochna squarrosa*. In the foreground, extensive use has been made of ornamental shrubs, and pink oleanders lend a gay note to many bungalows in the capital. Scented shrubs like *Murraya exotica* and *Cestrum nocturnum* exhale their perfume in many bungalows. However, no attempt has been made to vary the planting scheme, and, as a result, all bungalows look alike. By adopting different combinations of trees and by planting some of the flowering trees in pure avenues, New Delhi could have been made more colourful. Another defect from which the plantation schemes for compounds of New Delhi bungalows suffer, is, that fruit trees have been totally ignored, and too much emphasis has been laid on mere ornamentals. The tree-planting scheme of New Delhi can be very much improved, if fruit trees, like grafted mangoes, citrus, figs, and papayas are also planted in the backyards, thus achieving a happy compromise between beauty and utility.

Chapter XIII

ORNAMENTAL, FLOWERING, FOLIAGE AND SHADE TREES

STRICTLY speaking, all trees which are not cone-bearing are flowering trees. In some trees the flowers are brightly coloured as in *gulmohur* and spathodea, and in others they are small, inconspicuous and green as in *Asokan*. Trees which have showy flowers deserve to be classified as "Ornamental Flowering Trees" to distinguish them from trees with inconspicuous flowers which are otherwise desirable on account of their beautiful foliage and have been classified as "Ornamental Foliage Trees". While most of the ornamental flowering trees are deciduous, and a few are evergreen, nearly all the ornamental foliage trees are evergreen. Some of the ornamental foliage trees are particularly suitable for planting as shade trees along roads and in parks on account of their thick spreading crowns.

A scrutiny of the lists of ornamental flowering trees shows that only a few are indigenous, and the majority are exotics introduced from foreign countries like Madagascar, South Africa, Tropical and South America, Java, Malaya, Burma and China. While some of these trees like *gulmohur* and *gul-i-chin* have become fairly popular, there are a number of others which are still unknown to the layman, as no effort has been made to popularize them by propaganda. Boys and girls in schools should be taught the names of these beautiful trees, and parties of school girls and boys should be taken to public gardens to show these trees to them when they are in flower. The average man has an aversion for complicated Latin names. Latin botanical names have their merit, particularly on account of their international use and accuracy. On the other hand, popular names are often vague and have been indifferently used by various persons. If mental laziness is overcome, one should have no difficulty in mastering botanical names. Even illiterate *malis* learn to pronounce difficult English and botanical names in a comparatively shorter time; so there is no valid reason why educated persons should find much difficulty with them.

Though Latin names are to be preferred on account of their accuracy and international usage, there is no harm in having popular names in simple Hindustani as well. Most of our indigenous flowering trees have Indian names and these require only to be popularized. On the other hand, there are a number of foreign trees which have no Hindustani names. For these the present author has coined new names, and these can be easily popularized in schools, universities and gardening institutions. Name-plates with both Latin and Hindustani names should be fixed on selected specimen trees in all our public parks and gardens, so that the common man too

may learn to identify them rather than stand and gape in wonder at indecipherable Latin names.

The flowering of trees and crops is intimately connected with temperature, and it occurs later and later in the season as one moves from South to North, the delay in flowering being of the order of four days for every degree variation in latitude northwards. For example, mango flowers in Kerala about the first week of December, in Hyderabad-Deccan, about the first week of January, in Gujarat and Central India, about the first week of February, and in the Punjab about the first week of March. *Neem* flowers on the first of January in Malabar, on the first of February in Mysore, in the first week of March in Central India, in the first week of April in northern India and the Punjab area, and in the first week of May in the sub-Himalayan area. Similar variations are found in the flowering of tamarind and *babul*. Under an All-India Phenological Scheme, four trees—mango, *neem*, tamarind and *babul*—were selected for the study of the data of the flowering period. These trees grow in all the States, from Kanyakumari to the Himalayas, and can truly be called Indian trees, as they have an all-India spread. Phenological observations were made on important phytophases like the flowering, fruit setting, and maturity of the fruit in respect of these trees, and isochrones for each phytophase were drawn on maps.

Further, the variations in the time of flowering of the mango tree from the extreme South (about latitude 8°N) to the extreme North (about latitude 30°N) is roughly from first December to first March (90 days). In other words, the flowering of the mango tree appears to be delayed by nearly four days for every degree of latitudinal variation northwards. It is interesting to note that this is in agreement with the Bioclimatic Law formulated by Hopkins for North America. What is true of the flowering of these four trees is also true of most of the other flowering trees as well, and these maps can be taken as approximate guides for ascertaining the flowering period of other trees as well.

ORNAMENTAL FLOWERING TREES

Serial No.	Natural order	Botanical name	English & Indian names	Colour of flowers & period of flowering	Description	Gardening notes
I- 1.	Apocyanaceae	Plumeria *P. acutifolia* Poir	Hindi: *chameli gul-i-chin;* Bengali: *dalanaphula;* Kannada: *kudusampage;* Gujarati: *dolochampo;* Malayalam: *arali;* Marathi: *khairchampa;* Tamil: *ilattalari;* Telugu: *arhataganneru;* Oriya: *golochi*	White March-April and July to October	A small tree, 3 to 4 m high; bare stem; crooked branches bearing terminal clusters of broad lanceolate leaves, capped with large corymbs of fragrant flowers. Native of Mexico and Guatemala.	Easily propagated by cuttings in July and August. Allow the cuttings to wilt before planting. Can thrive in sandy and stony soil with a rainfall of 64 cm or upwards. There is a variety with white stem and branches which appear to be lime washed; common in Travancore.
2.	do.	*P. rubra* Linn.	Frangipani; Hindi: *lal champa*	Red March-April and July to October	Has red flowers.	
3.	do.	*P. alba* Linn.	Pagoda tree; White Frangipani; Tamil: *peru;* Telugu: *veyyivarahalu*	White March-April and July to October	A dwarf tree bearing clusters of dark-green ovate leaves. It is the prettiest tree of the *Plumeria* genus and is almost evergreen. Native of India, is seen in ancient Kushana Sculptures.	Propagated by cuttings. There are a number of hybrid plumerias designated by such names as 'tuberculata magnifica', 'lutea', 'Rene', etc., available at the Royal Agri-Horticultural Society's Garden at Calcutta. I have seen a few of them in flower, and some are very fine, with flowers distinctly larger than in the commonly grown varieties.
4.	do.	*Wrightia tinctoria* R. Br.	*Dudhi*	Red May	A small tree with an ivory white stem which bears numerous red flowers scattered among leaves in the month of May.	
II- 5.	Bignoniaceae	*Bignonia crispa* Buch.-Ham.	*Padiri*	White May-June	A very handsome tree with drooping boughs, glossy leaves and funnel-shaped delicately fragrant flowers.	A South Indian tree, also grows in Bengal. Suitable for moist districts only.
6.	Bignoniaceae	*Jacaranda mimosaefolia* D. Don.	Jacaranda, *nili gul mohur* R.	Violet blue March-April	A small tree, 5 to 10 m high with fern-like bipinnate leaves, and loose pyramidal panicles of 40 to 100 blue flowers. A native of Brazil.	Propagated by seed. Suitable for dry areas. Stands pruning well. Starts flowering at the age of five years and after 20 years becomes ugly and should be headed off. Quite common in the compounds of houses, particularly those of Secretariat bungalows at Lucknow, at Forest College, Dehra Dun and at New Delhi.

ORNAMENTAL FLOWERING TREES

Serial No.	Natural order	Botanical name	English & Indian names	Colour of flowers & period of flowering	Description	Gardening notes
7.	do.	Spathodea 1.*S. campanulata* Beauv.	The Fountain tree or Scarlet Bell tree or Tulip tree; Kannada: *nirukavi;* Telugu: *patadi*	Orange crimson February-March	A tall tree growing to a height of 21 m, large odd pinnate leaves; gorgeous terminal panicles of erect orange-crimson flowers. A native of Tropical Africa. One of the finest trees for scenic planting.	Appears very attractive when grown in clumps or avenues. Can be seen at its best at the Willingdon Sports Club, Bombay. Suited to districts with 40 to 100 cm of rainfall. Easily propagated from root-suckers or from cuttings. Also raised from seed. Demands rich, well-drained soil. Widely planted in Hyderabad (Andhra).
8.	do.	2. *S. nilotica* Seem.	do.	do.	Smaller tree with bright flowers. More beautiful than *S. campanulata.*	There are five or six trees behind Victoria's statue, in Alfred Park, Allahabad, which are a glorious sight in March.
9.	do.	*Tecomella undulata* Seem. Syn. *Tecoma undulata* G. Don.	Wavy-Leafed Tecomella; Hindi: *rugtrora;* Marathi: *rakhtreora;* Punjabi: *lahura*	Orange yellow March-April	A small tree; leaves greyish-green with wavy edges; flowers large, orange-yellow, in bunches of 5 to 10 at the ends of small lateral branches, very handsome when in full bloom.	Easily propagated from seed or cuttings. Flourishes in dry districts. Common in desert areas of the Punjab, Rajasthan and Gujarat.
10.	Bignoniaceae	*Millingtonia hortensis* Linn.	Cork tree or tree jasmine; Hindi: *akas neem, neem chameli;* Bengali: *akas nim;* Tamil: *karkku, kat malli;* Telugu: *kavuki*	Silvery-white flowers, appear in April-June and November-December. The flowers are delightfully fragrant	It is a tall, straight and very ornamental tree.	Cultivated all over India both in gardens and avenues.
III-11.	Bixaceae	*Cochlospermum gossypium* D.C.	Yellow Silk Cotton tree; Hindi: *gooloc, galgal;* Bengali: *golgol* Kannada: *arasinaburaga, bettatavare;* Gujarati: *kadachogund;* Malayalam: *appakutakka, chempani:* Marathi: *galgal, ganer;* Punjabi: *kumbi;* Tamil: *kannigaram katilavu;* Telugu: *adaviburaga, akshotamu;* Oriya: *beniyamrydami, ganiari*	Deep yellow February-March	A small tree 2 to 5 m high. Golden-yellow flowers appear when the tree is leafless.	Being a xerophytic plant flourishes in dry areas.

ORNAMENTAL FLOWERING TREES

Serial No.	Natural order	Botanical name	English & Indian names	Colour of flowers & period of flowering	Description	Gardening notes
IV-12.	Boraginaceae	*Cordia sebestena* Linn.	Scarlet Cordia; Hindi: *lal lasora* R.; Kannada: *challe-kendala;* Tamil: *aechinaruvihli;* Telugu: *virigi*	Orange-red or scarlet January-March or throughout the year	A small tree of dwarf habit and compact growth, rarely more than 5 m high; wrinkled leaves; flowers orange-red in large open clusters at the end of branches. Imported from Cuba and Tropical America.	Propagated by seed or by layers.
V-13.	Combretaceae	*Terminalia arjuna* Bedd.	The Arjun; Tamil: *vellamarda, kulamaruthu;* Telugu: *yermaddi;*	Creamy flowers of cup shape which resemble those of myrobalan March-June	It is a tall evergreen tree with a smooth grey bark. Leaves are oblong and opposite.	It is found throughout India, Burma and Ceylon, usually on the banks of rivers and streams.
VI-14.	Capparidaceae	*Crataeva religiosa* Forst F. (*C. nurvala*)	Caper tree; Hindi: *barna;* Bengali: *barun;* Kannada: *hole tumbe;* Gujarati: *varno;* Malayalam: *kili;* Marathi: *haravana;* Punjabi: *barna;* Tamil: *adicharanam;* Telugu: *ulimari;* Oriya: *barun*	White April	A small tree 3 to 4 m high, crooked branches; becomes laden with pale-yellowish flowers in the last week of April. It flowers in leafless condition and is very pretty indeed. Is suitable for planting in triangular plots in towns.	It is a very hardy and drought-resistant tree. Raised from seed in the monsoons. Common in Uttar Pradesh. Can be seen at Lucknow. Frost-tender and slow-growing.
VII-15.	Dilleniaceae	*Dillenia indica* Linn.	Hindi: *chalta;* Bengali: *chalita;* Kannada: *bettadakanagal;* Gujarati: *karmbal;* Malayalam: *chalita;* Marathi: *karmbel;* Tamil: *akku;* Telugu: *kalinga;* Oriya: *chalata*	White July	An erect evergreen tree, 10 to 12 m high rounded crown; leaves broad, pointed, with toothed margin. Flowers large, white and fragrant, borne singly at the ends of branches in July. Common in Bengal and Bihar.	Propagated from seed sown in monsoons. Suitable for moist localities. Frost-tender.
VIII-16.	Lythraceae	Lagerstroemia 1. *L. flos-reginae* Retz.	Queen's Flower or Pride of India; Hindi: *arjuna;* Bengali: *jarul;* Kannada: *challa holedachalla;* Malayalam: *atampu;* Marathi: *bondara;* Tamil: *kadali;* Telugu: *varagogu;* Oriya: *ary*	Mauve-purple or Mauve-pink April-May July-August	A small-sized evergreen tree with light grey smooth bark. In moist districts it is a large tree but in dry districts it is seldom 5 to 6 m high; flowers when only shurbby in size; mauve-purple or pinkish flowers in terminal panicles 30 cm to 60 cm high.	Grown from seed; a moisture-loving tree, does well on river banks. Commonly cultivated in Gorakhpur district. There are some nice specimens of this tree in Sikandar Bagh, Lucknow. Transplant when one year old; flowers three to five years after planting. Heavy pruning of side-branches is necessary.

ORNAMENTAL FLOWERING TREES

Serial No.	Natural order	Botanical name	English & Indian names	Colour of flowers & period of flowering	Description	Gardening notes
17.	do.	2. *L. thorelii* Gagnep	Queen's Flower or Pride of India; Hindi: *bari sanwani* R.	White and mauve, July-September	A dwarf bushy tree with mottled mauve flowers.	Easily grown from seed. Can be seen in Sikandar Bagh, Lucknow.
IX-18.	Leguminosae	*Amherstia nobilis* Wall.	Noble Amherstia	Salmon-pink with golden-yellow spots on petals. November & April	A medium-sized tree with drooping leaves with sprays of salmon-pink flowers tipped with golden-yellow spots.	Considered by some to be the most beautiful of all the flowering trees. Native of Burma. Flourishes in Bengal and other humid localities. Dies in North India on account of hot dry winds and frost.
19.	Leguminosae Papilionaceae	*Butea frondosa* Roxb. *B. monosperma (Lam)* Kuntze.	Flame of the Forest; Hindi: *dhak, palas;* Bengali: *kinaka;* Kannada: *mutiuga, brahma vriksha;* Gujarati: *kakria;* Malayalam: *brahmavriksham;* Marathi: *kakracha;* Punjabi: *chachra;* Tamil: *kattumurukku;* Telugu: *moduga* Oriya: *kinjuko*	Scarlet-orange February-March	A common jungle tree, which covers hectares of waste land. In the months of February and March, it flowers in leafless condition, and becomes covered with flaming scarlet-orange flowers with black calycles. Varieties with canary yellow and apricot colour flowers have been recorded.	Propagated from fresh seed, which germinates easily.
20.	Caesalpinioideae	Bauhinia 1. *B. purpurea* Linn.	Mountain Ebony, Purple Bauhinia; Hindi: *gulabi kachnar* R.; Bengali: *bevakanchan;* Kannada: *basavanapadu;* Malayalam: *suvannamandaram;* Marathi: *atamtti;* Punjabi: *karalli;* Tamil: *kalavilaichi;* Telugu: *bodanta;* Oriya: *boroda*	Purple to lilac or red November	A medium-sized evergreen tree. A very beautiful tree which deserves greater popularity. The only defect is top drying of branches.	Flourishes in high well-drained soil. Easily affected by low temperatures. Sow the seeds in lines in the beginning of the monsoons. Transplant from nursery in the first year. Cut off branches which lean out.
21.	do.	2. *B. tomentosa* Linn.	*Kachnar*	Pale-yellow	An evergreen shrubby tree bearing numerous pale-yellow flowers during rainy months.	
22.	do.	3. *B. triandra* Roxb.	Pink Bauhinia; Hindi: *lal kachnar* R.	Pink October & November	A small bushy tree with pinkish flowers.	

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Serial No.	Natural order	Botanical name	English & Indian names	Colour of flowers & period of flowering	Description	Gardening notes
23.	do.	4. *B. variegata* Linn.	Variegated Bauhinia; Hindi: *kachnar (baishakhi)*; Bengali: *bidul, kovidara*; Kannada: *arisinantigi*; Malayalam: *kovidaiam*; Marathi: *kanchan*; Tamil: *mandarai*; Telugu: *bodanta*; Oriya: *boroda*	Pink, white and purple varieties February-March	Flowers white with light yellow spots or pink with red spots or purplish, appearing when the tree is leafless.	It is a very beautiful tree with an avenue of these three varieties along with *B. krugii* is lovely.
24.	do.	5. *B. acuminata* Linn.	*Sufaid kachnar*	White All the year round	A small tree about 3 m high, nearly always in blossom with numerous white flowers.	Grown in Sikandar Bagh, Lucknow.
25.	do.	6. *B. corymbosa* Roxb.	*Sufaid kachnar*	Rosy-white April	A scandent shrub with small leaves.	
26.	Caesalpinioideae	7. *B. alba* Buch.-Ham.	*Sufaid kachnar*	White April	A dwarf, round-headed tree.	
27.	do.	Brownea 1. *B. coccinea* Loefl. ex Griseb.	West Indian Mountain Rose	Scarlet-red March	A small tree 2 to 3 m high; of handsome compact growth, with dazzling heads of scarlet flowers. There is no mass flowering, however.	Propagated by layers; does well in moist climate. There is a handsome specimen in Sikandar Bagh, Lucknow. Unsuitable for northern India as it is killed by *loo*—can only be grown in sheltered spots.
28.	do.	2. *B. ariza* Benth.	West Indian Mountain Rose	Rose-red March	A small spreading tree with beautiful foliage. Leaves droop in heat.	
29.	do.	3. *B. grandiceps* Jacq.	Rose of Venezuela	Bright-red March	Native of West Indies. A large-headed variety; mottled foliage.	Should be grown in a sheltered shady place.
30.	do.	Cassia 1. *C. fistula* Linn.	Indian Laburnum or Golden Shower; Hindi: *amaltas*; Bengali: *amultas, bandarlati*; Kannada: *kakke*; Malayalam: *konna, kritamalam*; Marathi: *bahava*; Punjabi: *alash*; Tamil: *appai*; Telugu: *aragvadhamu*; Oriya: *sandari*	Yellow April-May	A small hardy tree, sheds its leaves in March, and produces pendulous racemes of large bright-yellow flowers in April and May. Young leaves coppery-red.	A very common tree found wild at the foot of the hills of Uttar Pradesh and Assam. Can be seen to best advantage in Lucknow. Makes a beautiful avenue. Hardy, xerophytic, not eaten by goats. Boil the seeds for five minutes before sowing to soften the hard coat. Transfer the seedlings to baskets in first rains. Will grow in poor soil. Suitable for dry or moderately wet districts.
31.	do.	2. *C. javanica* Linn.	The Java cassia; Hindi: *java-ki-rani* R.	Pink May-June	A native of Malaya and Java, bears clusters of pink flowers.	

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Serial No.	Natural order	Botanical name	English & Indian names	Colour of flowers & period of flowering	Description	Gardening notes
32.	Caesalpinioideae	*C. nodosa* Buch.-Ham.	The Pink *mohur*	Pink May-June	A tree with a spreading crown. Flowers in big pink clusters appearing like bunches of roses on long branches. When the tree is in flower it appears like a huge bouquet of roses. It is the most beautiful of all flowering trees, flowers in the leafless condition and leaves appear in the lower branches first. It is at its best in the month of June. A native of Burma and Malaya.	Stake the young trees as they have a tendency to lean over. There is a beautiful specimen in front of the Taj Mahal at Agra and one in front of the Superintendent's Office in Sikandar Bagh, Lucknow. Suitable for moist localities. Can also be grown in dry districts in sheltered spots where the tree can be saved from hot winds.
33.	do.	*C. renigera* Wall.	The Burmese pink cassia	Pink May-June	Medium-sized 5 to 6 m. Introduced from Burma.	Common in Bombay City. Prefers a moist climate.
34.	do.	*Colvillea racemosa* Bojer	Colville's Glory; Hindi: *kilbli*	Orange to red July-August to October	Pinnate leaves and umbrella habit as in *gulmohur;* flowers orange to red in colour, in large drooping clusters. A native of Madagascar.	Propagated from seed, suited to moist or moderately dry low country. There are three trees in Alfred Park, Allahabad, which flower in October. Flowers appear in a scarlet fringe on the top of the crown and are a glorious sight.
35.	Leguminosae Papilionaceae	Erythrina 1. *E. indica* Lam var. *parcelli*	The Indian Coral tree	Scarlet-red February-March	A small quick-growing tree with variegated leaves. Racemes of scarlet flowers appear in clusters at the ends of branchlets before the leaves.	Propagated from cuttings one m long, 7·5 cm across. There is one plant in Alfred Park, Allahabad. Common in Bihar and Bengal.
36.	do.	2. *E. blakei* Hort.		Cinnamon-red April	A small tree with brilliant scarlet flowers. It is the most beautiful tree of the genus.	There is a nice shrubby tree of *E. blakei* in Sikandar Bagh, Lucknow, in front of the Superintendent's Office.
	do.	3. *E. crista-galli* Linn.	Cockspur, Coral Bean	Deep-red April	A dwarf tree bearing a profusion of deep-red flowers. It is a very attractive tree. A native of Brazil.	Government Nursery, New Delhi.
37.	Papilionaceae	*Gliricidia maculata H.B. & K.*	The spotted Gliricidia or Madre tree	Pale-pink February-March	A small quick-growing tree, long feathery leaves, leaf-fall in February, followed by sprays of pale-pink flowers, which resemble those of wisteria.	Easily raised from seed or cuttings one to two m long. Wood is brittle, the tree should be pollarded from time to time to keep it dwarf. A native of Tropical America. Quite common in Bombay and South India.
38.	do.	*Milletia ovalifolia* Kurz	Moulmein Rosewood	Lilac March	A small tree with beautiful lilac-coloured flowers appearing in leafless condition and entirely covering the tree. Its mauve and lilac pendulous racemes are a glorious sight.	It grows in Sikandar Bagh, Lucknow, and Khusru Bagh, Allahabad. Raised from seed.

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Serial No.	Natural order	Botanical name	English & Indian names	Colour of flowers & period of flowering	Description	Gardening notes
39.	do.	*Enterolobium saman* Prain.	The Rain tree	Pale-pink March-September	A large tree with pinnate leaves, grows very rapidly, flowers appear in pale-pink clusters.	Suitable for planting in exposed places; a wind-resisting plant; provides quick shade; suitable for avenue planting. Propagated by seed sown in rains.
40.	do.	Peltophorum; *P. ferrugineum* Benth. *P. inerme* Llanos.	The Rusty Shield-bearer; Tamil: *ivalvagai: perungondrai;* Telugu: *kondachinta*	Bright-yellow March to May and September to November	A big tree 12 to 24 m high with feathery-pinnate leaves; leaf-fall in January. Young leaves grow in February when the tree becomes covered with profusion of yellow flowers; it flowers twice in the year. A native of Ceylon.	A highly ornamental tree, very effective when planted alternating with *gulmohur,* its bright-yellow crowns contrasting with scarlet heads of *gulmohur.* Easily propagated from seed. There are some trees in Alfred Park, Allahabad, which appear highly ornamental with golden-yellow flowers in October. Common in Bihar, Bengal and the Western Ghats.
41.	Caesalpinioideae	*Saraca indica* Linn. *Jonesia asoka* Roxb.	The Asoka tree: Hindi: *ashok, sita asoka* R.; Kannada: *asoka;* Gujarati: *ashopalava;* Malayalam: *asoka, hemapushpam;* Marathi: *ashoka, jasundi;* Tamil: *asogam;* Telugu: *asokamu;* Oriya: *osoko*	Orange-red February-March	An evergreen tree with branches spreading in all directions; flowers in large compact clusters. On opening they are orange-coloured then turn red contrasting with the deep-green foliage. Hindus regard it as sacred, being dedicated to Kama Deva, God of Love.	A very handsome tree with a thick shade. On account of its spreading habit it should be grown in a clump in an open space. Grown from seed. Some people regard it as the prettiest Indian tree. There is a handsome specimen in Khusru Bagh, Allahabad. Fairly common in Bengal.
42.	do.	*Poinciana regia* Bojer (*Delonix regia* Raf.)	*Gulmohur* flamboyant; Kannada: *doddaratna-gandhi;* Malayalam: *alasippu;* Marathi: *gulmohr;* Tamil: *mayirkkondrai;* Telugu: *ettaturavi*	Scarlet orange-red April-June	A spreading umbrella-like tree, pinnate feather-like leaves; leafless in March; in April a brilliant mass of scarlet flowers. A native of Madagascar.	A very common tree, especially in Lucknow. Seeds should be soaked in hot water for eight minutes before sowing. Also grown from cuttings. A beautiful avenue tree, especially when grown alternating with *amaltas.*
43.	do.	*Poinciana elata* Linn.	*Gulmohur* Hindi: *sankesar;* Kannada: *kempukenjiga;* Gujarati: *sandesra;* Marathi: *sandesra, sankasura;* Tamil: *padenarayan;* Telugu: *chilikeswarapu;* Oriya: *simamondaro*	Yellow-white February-March	A short and stumpy tree with umbrella-like crown. Gets laden with yellow-white flowers in February-March, which provide a pleasant contrast with its bright-green feathery leaves. Commonly grown in Madhya Pradesh. Introduced into India by the Arabs from Abyssinia.	Common in Hyderabad, Andhra Pradesh.

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Serial No.	Natural order	Botanical name	English & Indian names	Colour of flowers & period of flowering	Description	Gardening notes
44.	Papilionaceae	*Pongamia glabra* Vent.	*Karanj*	Mauve April-May	A dwarf deciduous tree, with trifoliate shiny *Shisham*-like leaves; flowers in leafless condition in the last week of April when it is laden with lilac or mauve flowers which resemble those of Milletia. Appears very pretty when flowering. Provides excellent shade. Suitable for platforms of railway stations.	Is raised from seed in rains. A sight in May when laden with flowers; fast growing.
45.	do.	*Pterocarpus indicus* Wild.	Padauk tree; Hindi: *padauk;* Kannada: *honne;* Tamil: *vengai;* Telugu: *ettavegisa, simagandamriga-punetturu*	Golden-yellow May-July	A tall tree 12 to 15 m high, bears racemes of orange-yellow flowers in early rains. Flowers are very short-lived.	A native of Burma and Malaya. Suitable for moist sea-side districts of South and East India. Propagated from seed.
46.	Papilionaceae	*Sesbania grandiflora* Poir.	*Agastya*	Cream or pink December	A small quick-growing tree; pinnate leaves; two varieties: one with salmon-pink flowers and the other with cream-coloured flowers of comparatively large size; borne singly. Flowers eaten in the form of *pakodas.* Pods long and unsightly and should be plucked off.	Raised from seed in rains. Yields a nice hedge in a year and flowers the same year.
X-47.	Malvaceae	*Hibiscus collinus* Roxb.		Rose-pink with dark puce-coloured eye Nov.-Dec.	A small tree with spreading branches and trilobed heart-shaped leaves.	A very ornamental tree which looks very pretty on a lawn. There is one tree in Gulabbari Park, Fyzabad.
48.	do.	*Kydia calycina* Roxb.	Roxburg's Kydia; Hindi: *baranga, choupultea;* Kannada: *belagu, bellaka;* Gujarati: *mhotihirwani;* Malayalam: *velukka;* Marathi: *bhendi;* Punjabi: *pola, pula;* Tamil: *vendai;* Telugu: *kondapotari, panchadotuka;* Oriya: *bankopasia*	White September-October	A small tree with large irregularly heart-shaped leaves, bearing panicles of white or pinkish flowers.	Propagated from seed—in nursery. Transplant seedlings when five to eight cm high. Quick-growing tree.
49.	do.	*Chorisia speciosa* St. Hill.	Mexican Silk-Cotton tree	Light-yellow October	A beautiful tree with bottle-shaped green trunk. It bears numerous light-yellow flowers in leafless condition in the month of October. Commonly grown in Lucknow and Dehra Dun.	It is a fast-growing tree which begins flowering in about five years. Raised from seed. Sown in rains.

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Serial No.	Natural order	Botanical name	English & Indian names	Colour of flowers & period of flowering	Description	Gardening notes
50.	Papilionaceae	*Thespesia populnea* Soland ex Correa.	Portia tree, *Bhendi* tree, Tulip Tree; Hindi: *bhendi, pipal;* Bengali: *dumblagaja-shundi;* Kannada: *aratsi, hwarsi;* Gujarai: *bendi, parasapiplo;* Malayalam: *chandamaram;* Marathi: *bendi, ranbhendi;* Punjabi: *pahari pipal;* Tamil: *kallal;* Telugu: *galgaiavi;* Oriya *gunjausto Khambar*	Yellow and cinnamon-red. All the year round	A large, evergreen tree wtih glossy dark-green poplar-like leaves, flowers appear singly off and on throughout the year. Grows to a height of 10 to 12 m. Is extremely salt-resistant.	Easily raised from seed or cuttings. It has a crooked stem and is suitable for medium-sized gardens. Prefers a light-porous soil. There are many trees opposite Municipal Museum, Allahabad, which flower profusely in October. Very common in Madras, Mysore & Kerala.
XI-51.	Ochnaceae	*Ochna squarrosa* Linn.		Bright-yellow, blue May	A small tree bearing bright-yellow flowers in early May. Fairly pretty.	Raised from seed and cuttings in monsoons.
XII-52.	Moraceae	*Ficus benghalensis*	Banyan tree; Hindi: *bargat, bor, ber;* Kannada: *ala;* Malayalam: *peral;* Telugu: *mari, peddamari;* Marathi: *war*	Flowers are concealed in fleshy figs. These figs grow in pairs like red cherries	It is epiphytic. The leaves are large and leathery and dark-green. The tree is huge in size and is worshipped by Hindus. It is an excellent shade tree.	Common all over India.
XIII-53.	Moringaceae	*Moringa oleifera* or *M. Pterygosperma* Lam. & Gaertn.	Drumstick tree or Horse radish tree; Hindi and Bengali: *soanjana, suhunjna;* Tamil: *morunga;* Telugu: *munga;* Malayalam: *sakhta*	Creamy-white flowers appearing in large clusters; February-April	It is a pretty tree. The leaves are divided and subdivided. Fruit edible. Oil and fibre are also extracted.	Very common, particularly in Bombay State. Grows wild in the Western Himalayas.
XIV-54.	Rubiaceae	*Mussaenda glabrata* or *M. frondosa* Linn.	Paperchase tree or Dhobi tree; Hindi: *lanchut, sarvad;* Tamil: *vellaiyilai;* Marathi: *bhutkesh;* Malayalam: *vellila*	Small orange flowers, July-October	It is an erect shrub or a small tree with a tendency to climb. Stems and veins are red. Used for medicinal purposes.	
XV-55.	Sapotaceae	*Madhuca latifolia* or *Bassia latifolia*	The *Mohwa* or Indian Butter tree; Hindi, Bengali and Marathi: *mohwa;* Tamil: *kat-illipi, illupai;* Telugu: *ippa;* Malayalam: *illupa*	Calyx plum-coloured, corolla creamy-white February-April	Very important Indian forest tree. It has nutritious flowers. Deciduous. The tree blooms at night and flowers fall to the ground at dawn. Its different parts are put to a variety of uses.	

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ORNAMENTAL FLOWERING TREES

Serial No.	Natural order	Botanical name	English & Indian names	Colour of flowers & period of flowering	Description	Gardening notes
XVI-56.	Solanaceae	*Solanum grandi-florum* Ruiz & Pavon.	Large flowered Night Shade or Potato tree	Bluish-violet All the year round	It is a shrub or small tree 10 to 12 m high. Leaves large, 25 to 37 cm long. Cultivated in gardens for large showy flowers and ornamental foliage.	Native of South America. Propagated from seed or cuttings and thrives best in sheltered places.
XVII-57.	Sterculia-ceae	*Sterculia foetida* Linn.	Wild Almond or Poon tree; Hindi and Bengali: *jungli badam;* Tamil: *pinari, illawa;* Malayalam: *pinari*	Crimson February-March	It is a tall, straight tree with horizontal branches.	It is originally found in East Africa and North Australia. Very common in Burma and Ceylon.
XVIII-58.	Zygophyl-laceae	*Guaiacum officinale* Linn.	Lignum Vitae Tree or Tree of Life	Bright-blue March & November	A shrubby tree with small dark-green leaves. It bears clusters of bright-blue flowers in great pro-fusion in the months of March and November. The colour of the flower fades from deep-blue to light-blue, the variegated pattern of colours produc-ing a beautiful contrast with the dark-green leaves. Introduced from West Indies.	Raised from seed. A good specimen can be seen near the Ajanta Museum in Hyderabad.

N.B.—The dates of flowering given above relate to northern India only. The same tree would flower 2½ to 3 months earlier in southern India and about a month earlier in Central India.

UNCOMMON FLOWERING TREES WHICH DESERVE GREATER POPULARITY

I- 1.	Araliaceae	*Brassaia actinophylla* F. Muell.		Crimson July	A small tree with large radially-divided leaves, with a terminal inflorescence of several radiating spikes 90 to 120 cm long.	A native of Queensland in Australia; suitable for moist districts.
II- 2.	Bignoniaceae	*Tabebuia 1. T. rosea* D.C.		Pale-mauve June	A small erect tree, palmately five-leaved, producing beautiful pale-mauve flowers.	A native of Mexico suited to moist localities. Grown from seed in the monsoon.
3.	do.	*2. T. spectabilis* Nichols.	*Basant Rani* R.	Yellow March-April	A small tree, gets covered with bright-yellow bell-shaped flowers when leafless in spring. Flowers drop in the morning forming a bright-yellow carpet below the tree.	A native of Venezuela. Suited to moist localities. Grown from seed in rains.
III- 4.	Bixaceae	*Oncoba spinosa* Forsk.	Bride of the Desert *Arbi Dulhan*	White April-May	A small bushy tree with light-green ovate leaves. Bears large white, solitary, sweet-scented flowers.	Native of Arabia, suited to dry areas.
IV- 5.	Guttifereae	*Mesua ferrea* Linn.	Ceylon Iron-wood tree *Naka, Nagkesar*	do.	A medium-sized tree, produces large white flowers with a central bunch of yellow stamens. Young leaves are deep-crimson above and silvery below.	Grown in Ceylon near Buddhist temples. Suited to hot and moist areas. Common in Assam.
V- 6.	Leguminosae	*Boulsanthus speciosus* Harms.	Rhodesian wisteria *Gul-i-Nilam*	Deep-blue	A beautiful slow-growing tree with glossy dark-green pinnate leaves. It bears drooping wisteria-like racemes of most beautiful deep-blue, sweet-scented flowers.	A native of Rhodesia, South Africa. Propagated by seed in rains.
7.	Leguminosae	*Lysidice rhodostegia*	Rose of China *Hance*	Rose-purple January-February	A large, handsome tree with pinnate leaves, bearing erect loose panicles of rose-purple flowers with pink scaly bracts which persist after the flowers are shed.	A native of South China, thrives in moist localities.
8.	do.	*Pterocarpus echinatus* Pers.		Orange-yellow April-May	A medium-sized tree with large clusters of pale-orange-yellow flowers which look very pretty.	A native of the Philippines, also grows in Ceylon.
9.	do.	*Pterocarpus indicus* Willd.	*Padauk* or *Senna Padauk*	Yellow March-April	A tall and handsome tree with a round spreading crown, long drooping branches and pinnate leaves. Yields fine timber.	A native of the Andamans, suitable for big compounds or parks. Suitable for moist districts.
10.	do.	*Saraca declinata* Miq.	Kannada: *Honne;* Tamil: *Vingai;* Telugu: *Ettavisisa*	Orange-yellow February-March	A small tree with large heads of bright orange-yellow flowers borne on the stem and main branches.	A native of Sumatra. Very striking when in flower. Thrives in shady and sheltered situations. Suitable for moist districts.
11.	do.	*Schizolobium excelsum* Vog.	*Basanti* R.	Bright-yellow February-March	A large quick-growing tree with feathery bipinnate leaves. Flowers borne on large erect sprays when the tree is bare.	A native of Brazil, suited to moist localities.
VI-12.	Proteaceae	*Stenocarpus sinuatus* Endl.	Tulip tree of Queensland	Scarlet May-June	A tall erect tree, bearing clusters of showy scarlet flowers.	A native of Australia, suited to moderately moist places.

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TREES WITH ORNAMENTAL FOLIAGE

Serial No.	Natural order	Botanical name	English and Indian names	Description	Gardening notes
I-1.	Annonaceae	*Polyalthia longifolia* Benth. and Hook f.	The Mast tree Asokan *Deodar* (Hindi) *Debdaru* (Beng.)	Tall evergreen tree with a symmetrical pyramidal crown; beautiful glossy light-green leaves in great profusion, translucent when young, flowers greenish, inconspicuous in March; fruits in July. Native of Ceylon and Bengal.	This tree is very graceful and is suitable for planting in avenues. Grown five m apart on the southern side of the compound wall, they afford a very good protection from the heat of the sun, and act as wind-break. A very common tree in Oudh and Allahabad. Seeds sown in July. Sown in flower pots. Plant out when of suitable size. Can be easily headed off.
II-2.	Burseraceae	*Filicium decipiens* Thw.	Fern tree	An evergreen tree of medium size, with ornamental fern-like leaves; crown compact and globular.	An exceptionally good tree for grouping or small avenues. Propagated by seed.
III-3.	Combretaceae	*Anogeissus pendula* Edgew.	*Dhao*	A very ornamental medium-sized tree with drooping branches and small leaves. Stem white.	Suitable for avenues. Obtainable from Govt. Gardens, Saharanpur.
IV-4.	Euphorbiaceae	*Phyllanthus emblica* Linn.	*Amla*	A very handsome medium-sized tree with beautiful feathery leaves, and mottled stem. Fruit is pickled and has high Vitamin C value.	The grafted variety from Banaras is exceedingly handsome. Suitable for planting in avenues and groves.
5.	do.	*Putranjiva roxburghii* Wall.	The Child Life tree, *Putranjiva* or *Jiva puta* or *patju*	A very handsome large evergreen tree with a semi-globular crown; dense glossy foliage on semi-pendulous branches; resembles *Polyalthia* in habit. Flowers inconspicuous, March-May.	Suitable for planting in avenues. Easily transplanted from nursery stock. Common in Lucknow. Can be easily headed off.
6.	do.	*Sapium sebiferum* Roxb.	Chinese Tallow tree, *Vilayati shisham*	A medium-sized deciduous tree with leaves resembling those of *shisham*. In autumn leaves turn bright-scarlet and present a beautiful sight. The tree is extremely frost-resistant and commonly grows in Kangra district. Introduced from China.	The seeds are coated with white wax and germinate easily.
V-7.	Leguminosae	*Tamarindus indica* Linn.	*Imli*	A big evergreen tree with small leaflets, 10 to 15 m high and a large spreading crown. Flowers in April-June; fruits in November-December.	Grows well in all localities free from sharp frosts. Grown from seed in March-April, transplanted in monsoons, but of slow growth. Fine specimens of *imli* trees can be seen in Guptar Park, Fyzabad, where they have attained a huge size. An excellent tree for roadside avenues.
8.	Leguminosae Mimosoideae	*Acacia auriculiformis* A. cunn. ex. Benth.	Australian phyllode acacia or Australian wattle	A very handsome evergreen tree with pendulous branches, and leaf-like phyllodes.	Planted in a clump at the back of the house, it provides a very shady corner suitable for study. Also makes a fine avenue. There are some fine specimens in Alfred Park, Allahabad.

TREES WITH ORNAMENTAL FOLIAGE

Serial No.	Natural order	Botanical name	English and Indian names	Description	Gardening notes
VI-9.	Meliaceae	*Melia indica* Linn. or *Azadirachta indica*	*Neem*	Common tree, about six to ten m high. It is a hardy tree and stands pollarding well. If a tree grows too big, cut off the crown from the top of the stem in December or January. New shoots will sprout in March. It sheds its old leaves in March and produces glossy young leaves and fragrant white flowers in the first week of April. The flowers and fruit stink badly after a shower. It is a very shady tree which grows successfully in saline soil even in extreme drought. On account of its large number of leaves, the leaf-area is big and rate of photosynthesis is also high. Consequently, gives more oxygen during daytime as compared with other trees. Hence its reputation as purifier of air is not unjustified.	Seed of *neem* does not keep. It should be sown after collection.
10.	Meliaceae	*Melia azedarach* Linn.	*Dake, bakain* (Persian lilac)	A very fast-growing middle-sized tree, five to eight m high with smooth bark and beautiful leaves; soft lavender-coloured flowers in March-April; fruits in November-December.	Grown from seed in rains. Not attacked by rats or white ants on account of its bitter bark. Rather short-lived. It is common in the Punjab especially around wells fitted with Persian wheels and deserves popularity in Uttar Pradesh also.
VII-11.	Moringaceae	*Moringa pterygosperma* Gaertn.	Horse Radish tree, *Sainjan*	A handsome quick-growing tree with pinnate fern-like leaves. Bears white or cream-coloured flowers from the end of January to middle of February. Pods cooked as vegetable.	Sow the seed in July. This tree stands pollarding very well and new shoots appear very quickly.
VIII-12.	Myrtaceae	*Callistemon lanceolatus* Sweet.	Scarlet Bottle Brush tree *Lal botal bursh*	A very handsome evergreen tree with pendulous branches as of the weeping willow with clusters of small leaves. Scarlet flowers in March in bottle brush-like tufts. It again flowers in October.	Its graceful 'weeping habit' makes it suitable for avenue planting. Propagated by seed. A common garden tree in the Punjab and Uttar Pradesh.
13.	do.	*Eucalyptus citriodora* Hook	Blue Gum tree *sufeda*	Slender trunk, smooth, clean, few branches, lemon-scented leaves, ever-green. Flowers in May-June. A native of Australia.	Grows rapidly, has a gregarious habit and should be planted in clumps or avenues.
14.	do.	*Eucalyptus filicifolius* F. Muell		A very ornamental eucalyptus with a profusion of crimson flowers.	Suitable for avenues.

SHADE TREES

Serial No.	Natural order	Botanical name	English and Indian names	Description	Gardening notes
I-1.	Ebenaceae	*Diospyros embryopteris* Pers.	*Gab*	An evergreen tree with a spreading habit, about eight to ten m high with smooth shining leaves covering its spreading branches. Sexes separate. Introduced from China.	There is a fine specimen in Govt. Gardens, Saharanpur. Children use the low spreading branches as see-saws. Suitable for public parks.
II-2.	Myrtaceae	*Eugenia cuspidata* Berg.	*Jamoah*	A medium-sized evergreen tree with shady crown of bright-green leaves and light-yellow stem. The tree renews its leaves imperceptibly in the month of March, and the new leaves have an attractive light-green colour. A very desirable avenue tree for town roads and is particularly effective when grown alternating with deciduous flowering trees like *kachnar*, *amaltas* and *jacaranda*. Fruit is sour and small in size.	Grown from seed. This tree has been extensively grown as a road-side avenue tree in New Delhi. Alternated with various varieties of *Bauhinia variegata*, it looks very pretty.
3.	do.	*Eugenia jambolana* Lam.	*Jamun*	Is a bigger tree with dark stem and edible fruit.	Grown from seed.
III-4.	Urticaceae	*Ficus* 1. *F. infectoria* Roxb.	*Pakur*	A large shady tree 11 to 12 m high with aerial roots and well-formed deep but low crown providing a thick shade. In April it is covered with delicately-tinted copper-coloured foliage.	Propagated from seed sown in nursery stock or propagated by stumps. Branch cuttings produce trees with a low spreading crown, and ugly stem. Can be seen to its best advantage in Bareilly district, especially along Bareilly-Nainital Road. Suitable for moist districts.
5.	do.	2. *F. retusa* Linn.	*Chilkan* R.	A very shady, spreading tree with glossy dark-green leaves. It is evergreen and the best shade tree available in this country. It is ten to eleven m high and is as large as a banyan tree.	Common in New Delhi.

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Chapter XIV

SOME ODD AND UNUSUAL TREES

IN this age of planning and standardization, the craving for individuality can easily be appreciated. Every individual desires to have some odd trees in his garden to excite the wonder and curiosity of neighbours and visitors. There are some trees, indigenous as well as exotic, which appeal to this trait of human character.

Of these odd and unusual trees, cycas and ginkgo have special historical and botanical interest. Cycas or the so-called sago-palm is a comparatively common garden tree and is usually mistaken for a palm. It is as much related to a palm as a sea-horse is to a horse or a shark to a whale. The sea-horse and the shark are fishes and the horse and the whale are mammals. Cycas is nearer to ferns than to palms. Like ferns, the powder-like pollen in male cones produces living motile sperms. The trees that we commonly notice in our gardens are female plants with woolly female cones bearing scarlet-red ovules. In the Jurassic period when birds were evolving from reptiles, there were big forests of cycas and tree-like cycads. At present the cycas is a living fossil, survivor of an ancient race of plants which dominated the surface of the earth millions of years ago. Similarly, ginkgo or the maiden-hair tree which has been saved from extinction by Chinese priests who gave it shelter in their temples, is a living fossil. In this tree too we find that motile sperms which actively swim about in drops of water are produced as in animals. While cycas is easy to propagate by means of bulbils, ginkgo, which is grown from seed, is a difficult tree. In Dehra Dun, it has attained a reasonable size.

We may as well mention Araucaria which is a distinctive tree and when successfully grown arouses considerable interest among visitors. A native of tropical regions, it is grown in pots in cool verandahs. Ornamental bamboos which are so popular in China, particularly the striped gold-with-green varieties are very attractive and the soil around them can serve as a base for rockeries.

Some of the parks in Lucknow are studded with an odd-looking giant tree with a swollen trunk. This is the baobab tree also called *gorakh imli* on account of its association with Gorakh Nath, guru of the *kanphata yogis*. The *yogis* use the shell of the gourd-like fruit of baobab as a water pot. This tree is an introduction from Central Africa and thrives in dry areas. With its spreading horizontal branches and swollen hollow trunk tapering suddenly, the baobab tree appears grotesque and is one of nature's odd creations. It is suitable for planting in spacious parks as well as in the countryside.

There are some trees with unusual type of fruits. The cannon-ball tree has ball-like fruits studded over the main stem while the candle tree has candle-like

fruits protruding from the stem. The sausage tree has sausage-like fruits dangling from its branches.

There are some trees which have odd and unusual leaves. *Ravenala*, the Travellers' Tree from Madagascar, has been grown with success in some private gardens in the moist districts of east Uttar Pradesh, in Bombay and in Bihar. It has banana-like leaves arranged in the form of a Japanese lady's hand fan. One of the most peculiar trees is Krishna's Ficus with leaves joined at the base, giving them a cone-like appearance. The legend is that Krishna used the leaves of this tree for storing stolen butter.

UNUSUAL TREES FOR THE GARDENS OF THE CURIOUS

Serial No.	Natural order	Botanical name	English name	Indian names	Description	Gardening notes
1. Angiosperms						
I.	Araliaceae	*Trevesia moluccana*			A small tree with very large palmate spreading leaves surrounding clusters of dark-purple berries.	It is a tropical tree, a native of Moluccas and is suitable for Bengal and tropical South India only.
II.	Bignoniaceae	*Kigelia pinnata*	Sausage tree	*Jhar fanoos*	A medium-sized spreading tree bearing long pendulous racemes of mottled dark purplish-red flowers which appear like candelabra. Its fruits are long and sausage-like in appearance with long, cord-like stalks.	A native of tropical West Africa which is equally at home even in the cold climate of the Punjab. Propagated by seed.
		Parmentiera cereifera	Candle tree	*Mom batti* R.	A small tree with light-green leaves. Its cylindrical candle-like yellow fruits are borne on the stem and branches in large numbers twice a year.	A native of Tropical America. Propagated by seed.
III.	Malvaceae	*Adansonia digitata*	Monkey bread tree	Baobab tree; Hindi: *gorakh imli, goram lichora;* Gujarati: *gorak chinch;* Tamil: *paparapulia, perauka*	It is a giant tree with thick smooth trunk with broad base and tapering stem. During the hot weather it is leafless, when its much divided crown appears gaunt and grotesque. Introduced into India by the Arabs from Africa.	Raised from seed. Planted singly in parks. Good specimens can be seen at Aurangabad and near Madras.
IV.	Myrtaceae	*Couroupita guianensis*	Cannon-ball tree	*Tope gola* R.	A remarkable tree with large pink and white fleshy flowers borne on the main stem. Its brown fruits are globular, about the size of a man's head, resembling a cannon ball.	A native of tropical South America, also found in Ceylon. It flourishes only in a moist tropical climate; propagated by seed. An excellent specimen of this can be seen in Victoria Garden, Bombay.
		Careya arborea		*Kumbhi*	A common forest tree in Madhya Pradesh. Its copper-red leaves appear very pretty in the month of October. Fruit is pitcher-shaped; hence the name *kumbhi*. Flowers pink-white, appear with new leaves in April-May.	Raised from seed. Planted singly in parks.

Serial No.	Natural order	Botanical name	English name	Indian names	Description	Gardening notes
V.	Scitamineae	*Ravenala madagascariensis*	Travellers' tree	*Khajur pankhi* R.	A remarkable tree which appears like a gigantic ladies' hand-fan. Its banana-like leaves are borne in two rows. Grows to a height of 10 to 12 m. Its sheathing leaf-stalks form receptacles in which water is stored.	Requires a hot and humid climate, being a native of Madagascar, though in U.P. it can grow in shaded and sheltered situations. Good specimens of this tree can be seen in parks in Bombay and Cochin.
VI.	Urticaceae	*Ficus krishnae*	Krishna's buttercup	*Makhan katori* R.	A small tree with folded leaves joined at the base which appears like containers of ice-cream *(kulphis)*.	Grows easily in North India.
2. Gymnosperms						
VII.	Cycadales	*Cycas revoluta*	China Fern tree		A remarkable tree which produces a crown of palm-like leaves every year. The sexes are separate. The pollen of male cones produces living motile sperms as in ferns and animals. A living fossil.	Propagated by bulbils.
VIII.	Ginkgoales	*Ginkgo biloba*	Maiden-hair tree	*Bal kunwari*	Beautiful foliage and has motile sperms. A living fossil.	A native of China; propagated by seed.

Chapter XV

FRAGRANT SHRUBS AND TREES

INDIANS appreciate fragrant flowers more than the Westerners do. In fact, in their adoration for fragrant flowers our ancestors had gone to the extreme of giving no place in their gardens to flowers that had no scent. Scents which appear too strong to the Europeans highly appeal to us, and no garden, particularly the one in the compound of a house, is regarded complete without fragrant shrubs like *champa*, *chameli* and *raat-ki-rani*.

Most of our fragrant trees and shrubs belong to the families Oleaceae, Rosaceae, Rubiaceae and Rutaceae. Some of these plants, particularly those belonging to Rosaceae and Rutaceae, are not merely ornamental but also are our favourite fruit trees. Apples, pears, peaches and cherries as well as citrus plants combine beauty with utility. So far as fragrant trees and shrubs are concerned, there is no reason why fragrance of flowers should not be combined with utility of fruit. The Moghuls planted limes and oranges in their gardens to enjoy their fruit and the fragrance of their sweet-scented flowers in the months of February and March.

Due to the pioneering efforts of Lal Singh, a large variety of citrus plants are available which can be grown in the back part of the compounds of houses. Oranges, like *Blood Red maltas*, *santras*, *mosambi*, pomelo, the red-fleshed *chikotra*, *khatta nimboo*, sweet lime and grapefruit not only provide health-giving fruit, rich in vitamin C, but also their flowers fill the air with delicate fragrance in the months of March and April. Hazara orange or *narangi bara-masi* appears very attractive when grown in standard form in wooden tubs, and is a desirable plant for decoration of verandahs, particularly in big buildings.

For internal hedges whose sole function is to mask unsightly features like garages and kitchen gardens or for separation of the rose-garden from the rest of the gardens, we can make use of fragrant shrubs and dwarf trees. Hedges of shrubs like *bela*, *raat-ki-rani (Cestrum nocturnum)*, *papra (Gardenia latifolia)* and *laung mushk* fill the air with delightful fragrance and are very desirable in the hot and rainy months. I cannot forget a joyful evening in a bungalow at Dewaldhar in Almora district in the month of May where the white flowers of *laung mushk* were studded all over a dwarf hedge. At sunset, the verandah was filled with the delicate scent of this species of gardenia and coupled with the warmth of the air it induced a feeling of relaxation and happiness which the legendary lotus-eaters might well envy. *Champa* and *laung mushk* are great favourites with the people of Kangra Valley, and in gardens in Dharamasala and Palampur the air is filled with the heavy scent of these flowers at night time. With the background of snow-covered Dhaula Dhar which glistens

like a lump of silver in the full moon, and the gurgling sound of numerous streams and rivulets, Kangra Valley appears like a fairy land. Perhaps it was an evening in this part of India that Sarojini Naidu described as:

> Where the golden, glowing
> *Champaka*-buds are blowing,
> By the swiftly-flowing streams,
> Now, when day is dying,
> There are fairies flying
> Scattering a cloud of dreams.

Some of the dwarf trees like *Acacia farnesiana*, *Murraya exotica*, *Gardenia lucida*, *Franciscea hopeana*, *Ixora parviflora* and *Lawsonia alba*, can also be utilized for making fragrant hedges. However, some of them require severe pruning to keep them in check.

Madhavi lata (*Hiptage madablota*) was a favourite creeper of the ancient Hindus. In Hindu flower symbolism, the *madhavi* creeper is likened to a frail young woman clinging on for support to her lord and master, symbolized by the mango tree. The marriage of the *madhavi* creeper and the mango tree used to be performed by ancient Hindu hermits. Says Kanva, the hermit, to Shakuntala after she had met her lover Dushyanta:

> My child, you found the lover who
> Had long been sought by me;
> I'll give the *madhavi* creeper a lover true
> This handsome mango tree.

Mehndi (Lawsonia alba) has an important function in the toilet of women in the East. Women stain the palms and soles as well as their nails with crushed *mehndi* leaves. It is also used for dyeing hair, and flame-coloured beards of *mullahs* owe their rich coppery tints to *mehndi*. *Mehndi* is the Camphire of Palestine and Hennah of Iran, and Pliny called it the Cypress of Egypt. It is commonly grown in India, Afghanistan and Iran, and is valued as much for the red dye of its leaves, as for the delicate fragrance which its flowers exhale at evening time in the months of June and July.

A *har-singhar*-tree planted in the eastern part of the compound of a house opposite the verandah used for sleeping can be a source of great pleasure during the months of September and October. After dark, the fragrance of the night-opening flowers of *har singhar* fills the atmosphere. A small cemented pool may be constructed below the tree for collecting the flowers. Every morning in the autumn months you will see

myriads of flowers with their orange-coloured corolla tubes resting on the surface of water on their spoke-like snow-white petals.

The *champaka* tree was very popular with the ancient Hindus and we find it sculptured in Kushan Mathura about 2,000 years ago. Even now *champaka* flowers are used by the women of Bengal in their coiffure, and the delicate fragrance of their amber petals adds to their subtle charm.

SHRUBS AND TREES WITH FRAGRANT FLOWERS

Serial No.	Natural order	Botanical name	Common Indian and English names	Description	Gardening notes
I.	Annonaceae	*Artabotrys odoratissimus*	*Hari champa*	A large scandent shrub, leaves broad, lanceolate, glossy; inconspicuous green flowers, usually hidden in leaves emitting delicate perfume, like those of over-ripe apples. Flowers in July and August.	Propagated by seed or cuttings in rains.
II.	Apocyanaceae	*Tabernae-montana coronaria*	Moonbeam *Chandni*	A shrub one to two m high with broad shining leaves and large double, dazzling white flowers which appear very pretty in moonlit nights in rainy months. Only slightly fragrant.	To improve the size of flowers, thin off the leaves when flower buds begin to form at the ends of branches. Propagated by layers or cuttings.
III.	Lythraceae	*Lawsonia alba* Lam.	Camphire hennah or Egyptian privet; Hindi: *mehndi;* Bengali: *medhi;* Tamil: *marudani;* Telugu: *gorinta*	Long spires of creamy flowers. Has clinging fragrance. Blooms throughout the year but is at its best during the hot weather and rains.	It is a common Indian shrub known in many parts of the world. When young, it is a smooth twiggy bush with straight branches which later on become thorny.
		Carissa carandas	*Karonda*	A small scandent thorny shrub with ovate dark shining leaves, bears highly fragrant flowers in February and white-pink and scarlet berries in July-August. Buds open in the evening and emit a delicious fragrance.	Propagated by seed in rains. Excellent for hedges.
IV.	Magnoliaceae	*Magnolia grandiflora*	*Bara champa*	A small tree three to five m high, laurel-like leaves; big white fragrant flowers in April and May.	Propagated by *gootee* but with difficulty.
		Michelia champaca	*Champa* or *champak*	A small handsome evergreen tree, five to six m high, fine foliage, flowers emit a delicious fragrance in April. Flowers yellow, solitary in axils of leaves.	Propagated by seed.
V.	Malpighiaceae	*Hiptage madablota*	*Madhavi lata*	A rampant shrub with horse chestnut-like fragrant flowers in March.	Propagated by seed.
VI.	Oleaceae	*Jasminum sambac*	Jasmine, *mugra*		Propagated by cuttings or division of roots.

SHRUBS AND TREES WITH FRAGRANT FLOWERS

Serial No.	Natural order	Botanical name	Common Indian and English names	Description	Gardening notes
		Nyctanthes arbor-tristis	*Har singhar*	A tree about three m high, bears a profusion of star-like, white flowers with orange centre at night time, which are shed in early morning. Flowers in September-October. A common tree in Oudh.	Propagated by seed sown in rains. Plants should be renewed every third year. It is quick growing; its long woody shoots should be pruned after flowering.
VII.	Rubiaceae	*Gardenia florida*	Cape jasmine *Gandharaja*	A delightful shrub, with glossy obovate leaves; bears large double white fragrant flowers. Flowers in March and April. A native of China. A large-flowered variety with leaves four inches in diameter is available.	Grows to a height of two to three m. Propagated by cuttings in rains.
		G. lucida		A small tree two to three m high; bears solitary fragrant white flowers in April and in July.	Propagated in rains by cuttings. Can be kept in a dwarf condition by pruning.
		G. latifolia	*Papra*	A small tree with leaves 37 cm long, 15 cm wide; large fragrant white flowers in April. Flowers turn yellow in the evening.	Propagated in rains by cuttings.
		Ixora parviflora	*Rookminee*	A shrub two- to two-and-a-half m high, with handsome lanceolate leaves three to 20 cm long; large corymbs of white fragrant flowers in April-May. A very beautiful plant. Is a native of China.	Propagated by layers or cuttings.
		Gardenia resinifera Roth.	The brilliant Gardenia; Hindi: *dekamali, dekamari, dikamali;* Marathi: *dekamari, dikamali;* Tamil: *kambil, kumbai;* Kannada: *bikke, dikkamalli;* Telugu: *bikki, erubikki;* Sanskrit: *hingu, hingunadika, jantuka*	Flowers large, pure white on opening, turning yellow later on. Flowers open in the evening and die soon after.	Large shrub or small tree, 6 to 8 m high. Leaves 7 to 20 cm long. Fragrant flowers used for medicinal purposes. Grows wild in Burma and South India. Propagated by seed and seedlings. Does best in partial shade.
		Anthocephalus indicus	*Kadamb*	Ovate-oblong glossy leaves, golden-yellow flowers solitary at the end of branchlets. Associated with Krishna. Flowers in great profusion in August.	Propagated by seed in rains. Good specimens of *Kadamb* can be seen near Bharatpur.
VIII.	Sapotaceae	*Mimusops elengi*	*Maulsari* or *vakula*	A beautiful tree with a thick spreading crown, dark-green glossy leaves; pale-green fragrant flowers in March. A very nice shade tree.	Propagated by cuttings in rains.
IX.	Rutaceae	*Murraya exotica*	Chinese box *Kamni*	An evergreen shrub, globular crown; sweet-scented pure white flowers.	Propagated by seed in rains.
		Citrus aurantium	*Khatta*	A spring shrub useful as a protective hedge.	Propagated by seed in rains.
X.	Solanaceae	*Cestrum nocturnum*	Lady of the Night; Night blooming jasmine, *raat-ki-rani*	A shrub with pale-green inconspicuous flowers which emit a strong fragrance at night.	Propagated by cuttings in rains.

To plant a hedge, make a trench, two to three feet deep. A shallow trench inhibits growth of deep roots, while a deep trench induces perpendicular deep root action. Place a layer of decomposed farmyard manure at the bottom of the trench, and refill it. Irrigate the trench, and when the soil has settled, sow the seed or cuttings in three or four lines. The seed may be soaked 6 to 24 hours before sowing to hasten germination. The trench should be kept moist till the seeds germinate or the cuttings sprout. A thin top-dressing of charcoal ash, compost and sand helps to retain moisture.

An occasional hoeing with a *khurpa* encourages the growth of the hedge plants, and should be followed by application of compost. Soft-wooded hedges can be pruned at any time, but hard-wooded species should be pruned when the season's wood has matured. When the plants have matured their wood, watering should be partially suspended. According to Griessen, over-watering of hedge plants induces shallow root action.

Apart from the fragrant flowering plants already mentioned, the following flowering trees and shrubs may also be used for making colourful hedges.

Erythrina indica Lamb.	Scarlet
Hibiscus—all varieties	Shades of red
Plumbago capensis Thumb.	Blue
Meyenia erecta Benth.	Blue
Strobilanthes	Blue
Bauhinia acuminata Linn.	White
Bougainvillaea	Shades of magenta, orange and red
Sesbania aegyptica Pers.	Light-yellow and salmon-pink
Tecoma stans H.B. & K.	Yellow

ORNAMENTAL FLOWERING TREES, SHRUBS AND CLIMBERS SUITABLE FOR MOONLIGHT GARDENS

A garden filled with trees, shrubs and climbers with white flowers can be very delightful on a moonlit night. The snow-white colour of the flowers stands out against the background of a dark-green foliage. An admixture of fragrant plants can further enhance the charm of such a garden. It is fortunate that many of the plants with white flowers are also fragrant. A scheme for such a garden is given below.

A. TREES

1. *Bauhinia alba*
2. *Citharexylum subserratum*
3. *Crataeva religiosa*
4. *Delonix elata*
5. *Dillenia indica*
6. *Erythrina variegata*
7. *Gardenia resinifera*
8. *Gliricidia alba*
9. *Holarrhena antidysenterica*
10. *Lagerstroemia indica* (white)
11. *Millingtonia hortensis*
12. *Mimusops elengi*
13. *Mimusops hexandra*
14. *Plumeria acutifolia*
15. *Plumeria alba*
16. *Prunus domestica*
17. *Wrightia tinctoria*

B. SHRUBS

1. *Acokanthera spectabilis*
2. *Barleria alba*
3. *Bauhinia acuminata*
4. *Brunfelsia undulata*
5. *Bougainvillaea* (Mary Palmer)
6. Bush rose
7. *Caryopteris*
8. *Cestrum diurnum*
9. *Cestrum nocturnum*
10. *Chonemorpha macrophylla*
11. *Coffea bengalensis*
12. *Datura suaveolens*
13. *Duranta ellisii*
14. *Gardenia florida*
15. *Hamiltonia suaveolens*
16. *Hibiscus syriacus*
17. *Ixora parviflora*
18. *Ixora undulata*
19. *Jasminum sambac*
20. *Jasminum pubescens*
21. *Jasminum officinale*
22. *Jasminum grandiflorum*
23. *Lagerstroemia alba*
24. *Lawsonia alba*
25. *Magnolia grandiflora*
26. *Melodinus monogynus*
27. *Meyenia alba*
28. *Murraya exotica*
29. *Nerium odorum*
30. *Nyctanthes arbor-tristis*
31. *Plumbago zeylanica*
32. *Solanum pseudocapsicum*
33. *Spiraea corymbosa*
34. *Tabernaemontana coronaria*
35. *Tecoma jasminoides*
36. *Trachelospermum jasminoides*

C. CLIMBERS

1. *Beaumontia grandiflora*
2. *Clematis paniculata*
3. *Echites caryophyllata*
4. *Hiptage madablota*
5. *Ipomoea sinuata*
6. *Ipomoea bana-nox*
7. *Jasminum auriculatum*
8. *Lonicera japonica*
9. *Porana paniculata*
10. *Rhynchospermum jasminoides*
11. *Solanum jasminoides*
12. *Thunbergia fragrans*
13. *Vallaris heyneii*

SELECT LIST OF ORNAMENTAL TREES FROM SANSKRIT LITERATURE

Sanskrit name	Botanical name
Arjuna	*Terminalia arjuna*
Asoka	*Saraca indica*
Champaka	*Michelia champaca*
Chuta	*Mangifera indica*
Devadaru	*Cedrus deodara*
Gandharaja	*Gardenia florida*
Kadamba	*Anthocephalus cadamba*
Karnikara	*Pterospermum acerifolium*
Ketaki	*Pandanus odoratissimus*
Kimsuka	*Butea frondosa*
Kovidara	*Bauhinia purpurea*
Kunda	*Jasminum pubescens*
Kuravaka	*Lawsonia alba*
Lodhra	*Symplocos racemosa*
Mandara	*Erythrina indica*
Naga Kesara	*Mesua ferrea*
Nari Kela	*Cocos nucifera*
Parijataka	*Nyctanthes arbor-tristis*
Punnaga	*Calophyllum inophyllum*
Sala	*Shorea robusta*
Krishna ish	*Albizzia amara*
Pit Sirish	*Albizzia lebbek*
Tala	*Borassus flabelliformis*
Vakula	*Mimusops elengi*

APPENDIX

Names of Ornamental Plants as revised recently

Name as given in text	Present valid name
Acer amoenum var. *sanguineum*	*Acer palmatum* Thunb. var. *amoenum* (Carr.)
Anthocephalus indicus A. Rich	*Neonauclea purpurea* (Roxb.) Merrill
Aroligia	*Ardisia* Sw.
Aroligia (*Bladhia*) *japonica*	*Ardisia japonica* Blume (*Bladhia japonica* Thunb.)
Barleria alba Lodd.	*Barleria cristata* Linn.
Bauhinia alba Buch.-Ham.	*Bauhinia variegata* Linn.
Bauhinia purpurea Linn.	*Bauhinia triandra* Roxb. Hort. Beng.
Bignonia crispa Buch.-Ham.	*Dolichandrone atrovirens* Sprague
Borassus flabelliformis Roxb.	*Borassus flabellifer* Linn.
Butea frondosa Koenig ex Roxb.	*Butea monosperma* (Lam.) Kuntze
Cephalotaxus drupacea	*Cephalotaxus harringtonia* Koch
Chrysanthemum japonicum	*Artemisia japonica* Thunb.
Cochlospermum gossypium DC.	*Cochlospermum religiosum* (L.) Alston
Crataeva religiosa Hook. f. & Thoms. non Frost. f.	*Crataeva nurvala* Buch.-Ham.
Diervilla decora	*Weigela decora* (Nakaki) Nakaki
Diospyros embryopteris Pers.	*Diospyros peregrina* (Gaertn.) Gurke
Duranta ellisia Jacq.	*Duranta repens* Linn.
Echites caryophyllata Blume	*Aganosoma caryophyllata* G. Don
Erythrina indica Lamb. *Erythrina indica* Lamb. var. *parcelli*	*Erythrina variegata* Linn. var. *orientalis* (Linn.) Merrill.
Eucalyptus filicifolius F. Muell	*Eucalyptus ficifolia* F. Muell
Euonymus alata	*Euonymus alatus*
Euonymus japonica	*Euonymus japonicus*
Ficus infectoria Roxb.	*Ficus lacor* Buch.-Ham.
Firmiana platanifolia	*Firmiana simplex* (L.) W. F. Wight
Gardenia florida	*Gardenia jasminoides* Ellis
Gardenia radicans	*Gardenia florida* var. *radicans* (Thunb.)
Gardenia resinifera Roth.	*Gardenia lucida* Roxb.
Gilibertia trifida	*Dendropanox trifidus* (Thunb.) Makino
Gliricidia maculata (H.B. & K.) Steud.	*Gliricidia sepium* (Jacq.) Walp.
Hiptage madablota	*Hiptage Benghalensis* Kurz.
Hydrangea hortensis	*Hydrangea opuloides* Koch
Ipomoea bona-nox Heyne Steud.	*Ipomoea grandiflora* Parodi
Iris Kaempferi	*Iris ensata* var. *ensata* Thunb.
Ixora parviflora Vahl	*Ixora arborea* Roxb.
Jacaranda mimosifolia D. Don.	*Jacaranda acutifolia* Humb. & Bonpl.
Jasminum grandiflorum	*Jasminum officinale* Linn. forma *grandiflorum* (Linn.) Kobuski
Jasminum pubescens Willd.	*Jasminum multiflorum* (Burm. f.) Andr.
Lagerstroemia flos-reginae Retz.	*Lagerstroemia speciosa* Pers.
Lawsonia alba Lam.	*Lawsonia inermis* Linn.
Lithocarpus edulis	*Pasania edulis* Makino
Madhuka latifolia or *Bassia latifolia*	*Madhuca indica* J. F. Gmel.
Magnolia verecunda	*Magnolia sieboldii* C. Koch.

Name as given in text	Present valid name
Melia indica Linn.	*Azadirachta indica* A. Juss.
Meyenia alba	*Thunbergia alba* Paxt.
Meyenia erecta Benth.	*Thunbergia erecta* T. Anders.
Mimusops hexandra Roxb.	*Manilkara hexandra* (Roxb.) Dubard
Moringa pterygosperma Gaertn.	*Moringa oleifera* Lam.
Murraya exotica Linn.	*Murraya paniculata* (Linn.) Jack
Mussaenda glabrata	*Mussaenda frondosa* Linn.
Nerium odorum Soland.	*Nerium indicum* Mill.
Ochna squarrosa Linn.	*Ochna jabotapita* Linn.
Oreodoxa regia	*Roystonea regia* O.F. Cook
Peltophorum ferrugineum Benth. Syn. *P. roxburghii*, *P. inerme* Naves	*Peltophorum pterocarpum* Backer ex K. Heyne
Philadelphus satsumanus	*Philadelphus satsumi* Sieb. ex Lindl. & Paxt.
Phyllanthus emblica Linn.	*Emblica officinalis* Gaertn.
Plumeria acutifolia poir	*Plumeria acuminata* Ait.
Poinciana elata Linn.	*Delonix elata* Linn.
Poinciana regia Bojer	*Delonix regia* Raf.
Pongamia glabra Vent.	*Pongamia pinnata* Pierre
Prunus domestica Linn.	*Prunus ceracifera* Ehrh.
Rhododendron mucronatum	*Rhododendron ripense* Makino
Rhododendron obtusum	*Rhododendron kaempferi* Planch.
Rhododendron pulchrum Sweet	*Rhododendron ledifolium* G. Don.
Rhynchospermum jasminoides Lindl.	*Trachelospermum jasminoides* Lem.
Schizolobium exselsum vog.	*Schizolobium parahybum* Blake
Sesbania aegyptica Pers.	*Sesbania sesban* Merrill
Spiraea corymbosa Roxb.	*Spiraea cantoniensis* Lour.
Tabernaemontana coronaria R. Br.	*Ervatamia coronaria* Stapf
Ternstoemia japonica	*Ternstoemia gymnanthera*
Trachycarpus excelsus var. *fortunei*	*Trachycarpus fortunei* (Hook.) H. Wendl.
Wisteria multijuga	*Wisteria floribunda* DC.

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